Volume XVI.
Number 4.

APRIL, 1899.

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TEXTILE WORLD,

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and
Industrial
Record.

SPECIAL COTTON NUMBER.

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GRANGER FOUNDRY & MACHINE CO.,

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Bleaching, Dyeing, Drying and Finishing Machinery.

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TENTERING MACHINES

With Patent Self-Feeding Clips.

Patent Combination Rolls

—OF—

HUSK AND COTTON.

Calenders, Mangles, Drying Machines, Tentering Machines, Hydraulic Presses, Etc.

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Short and Long Chain Dyeing, Sizing and Drying Machines.

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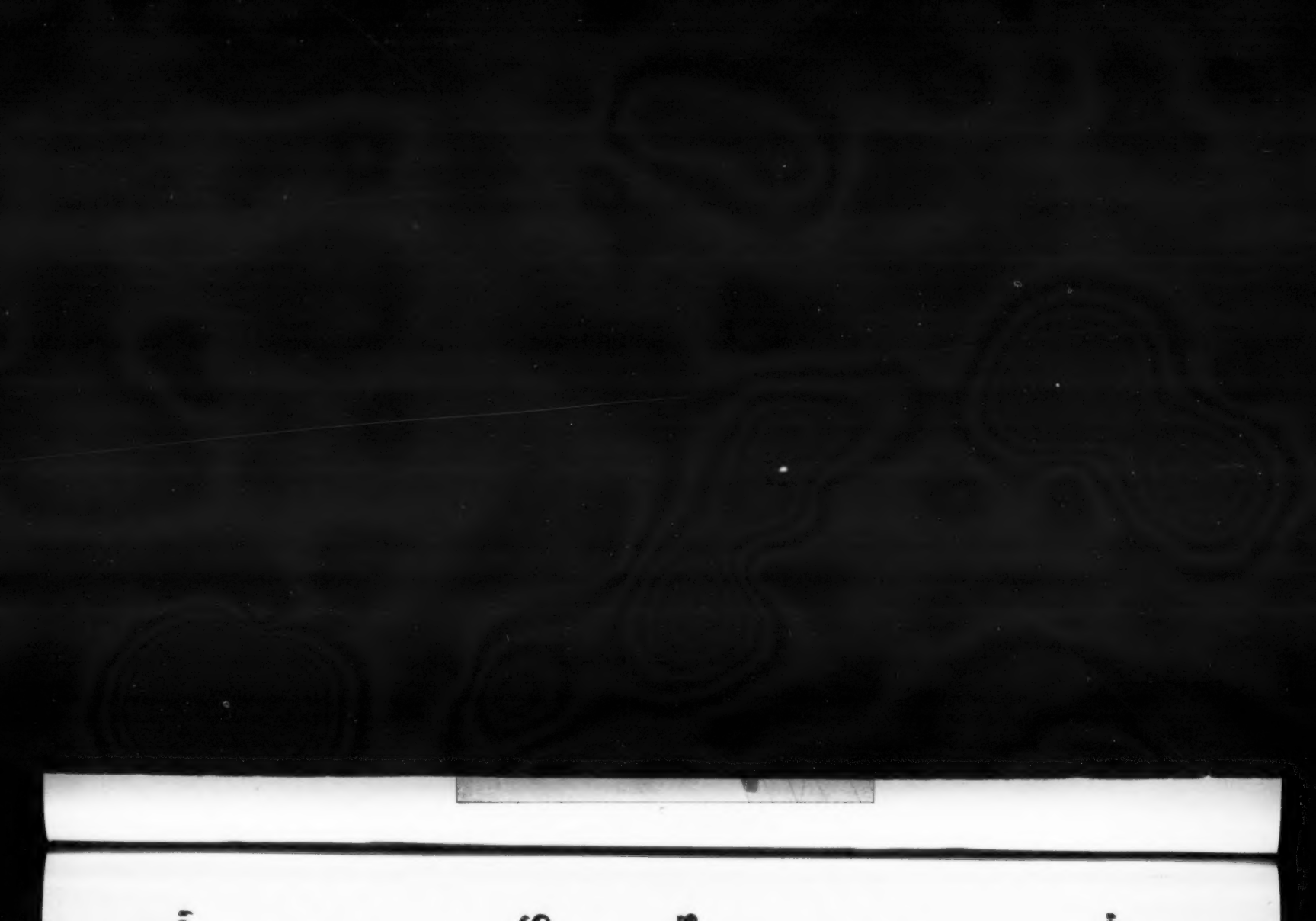

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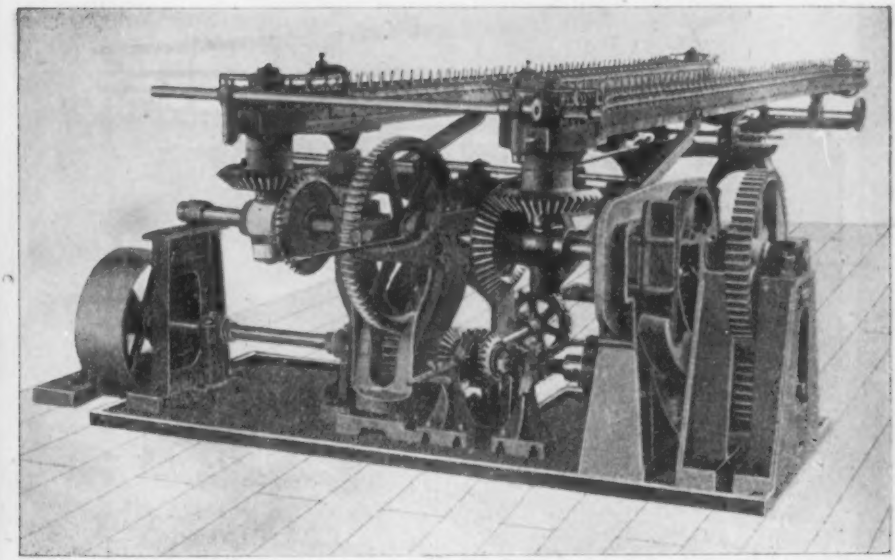

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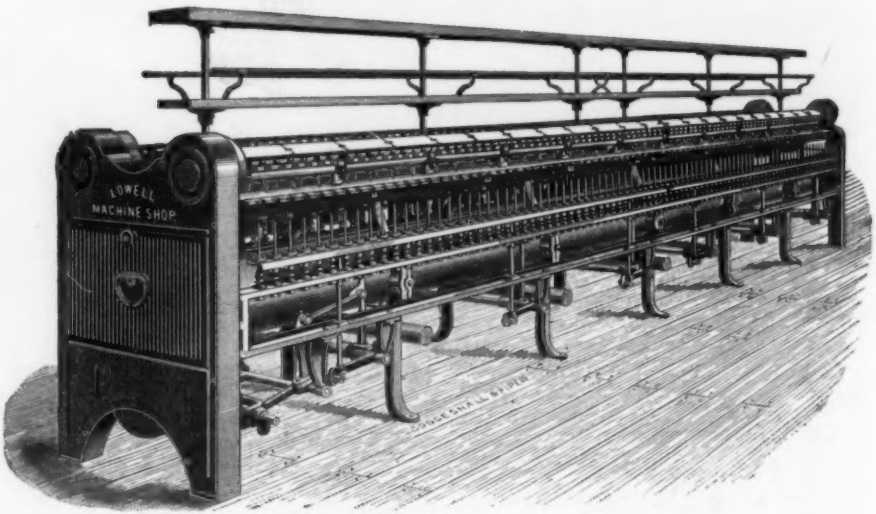
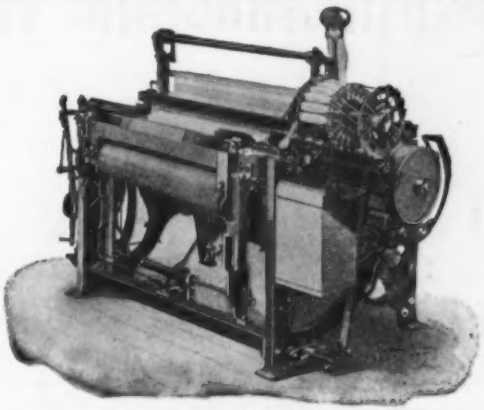


Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



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Business is Improving.

MANY cotton mill managers will, therefore, conclude that they can possibly have a chance to run their old machinery at a profit instead of facing a daily loss.

SHOULD they fail to meet the increased demand by improving their facilities with **new machinery,** they will soon realize that the chance of a profit will bring the competition of **new mills** that will start with the latest and best equipment.

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WE still sell Spindles, Temples, Separators, Spinning Rings, Twisters, Warpers, Spoolers, etc., etc., etc.

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The Whitin Machine Works,

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Reels,
Spoolers.

Revolving Flat Carding Engines,
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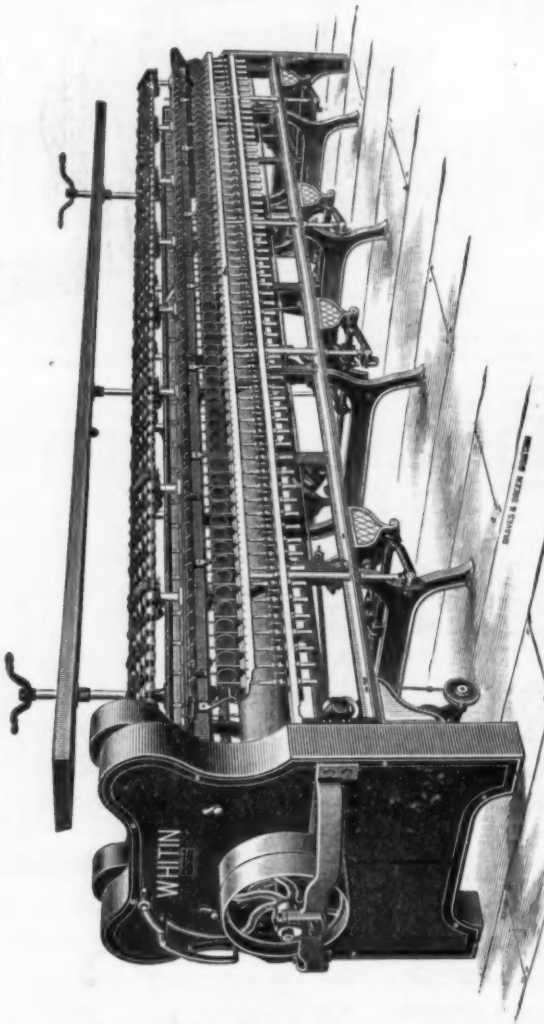
Wet and Dry Twisters,
Looms,



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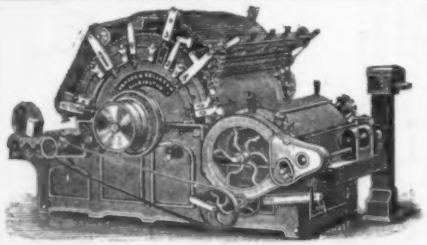

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The Simplest and Most Accurate. Greatest Production. Best Quality. Least Waste.

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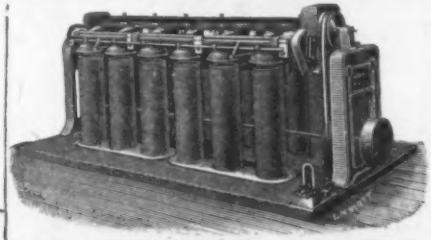
The quality of the sliver produced cannot be surpassed. Waste, "single" and roller laps are prevented, production increased, and great saving effected.



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All made from entirely new patterns and containing many valuable patented improvements.

Slubbing, Intermediate, and Roving Machines.

New patented Differential motion, New Arrangement of Cone Drums, New System of Balancing top or bobbin rail, etc.

All parts of above machines are made by special tools and are exact duplicates.

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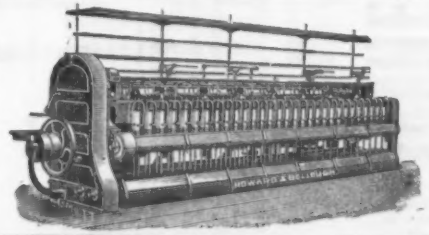

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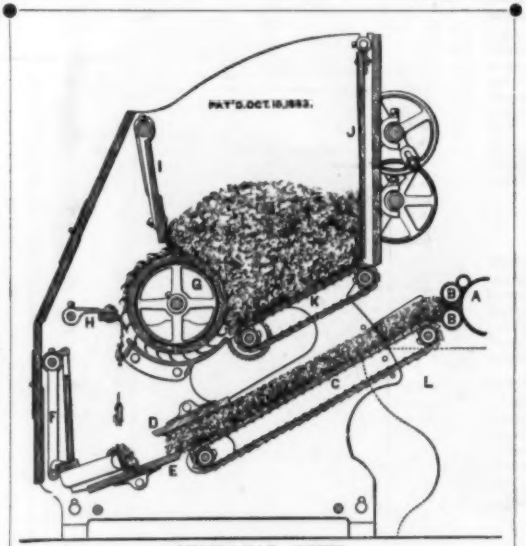
EDWIN FARNELL, Agent.



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It is built in all sizes and guaranteed as represented.

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Worsted Yarns.
C. T. Crocker, Pres. C. B. Smith, Treas.

FITCHBURG, MASS., March 4, 1896.

Woonsocket Machine and Press Co.,

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Yours respectfully, STAR WORSTED COMPANY,
(Second order.) A. GARTH, Supt.

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Woonsocket Machine and Press Co.,

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TAUNTON, MASS.

COTTON MACHINERY

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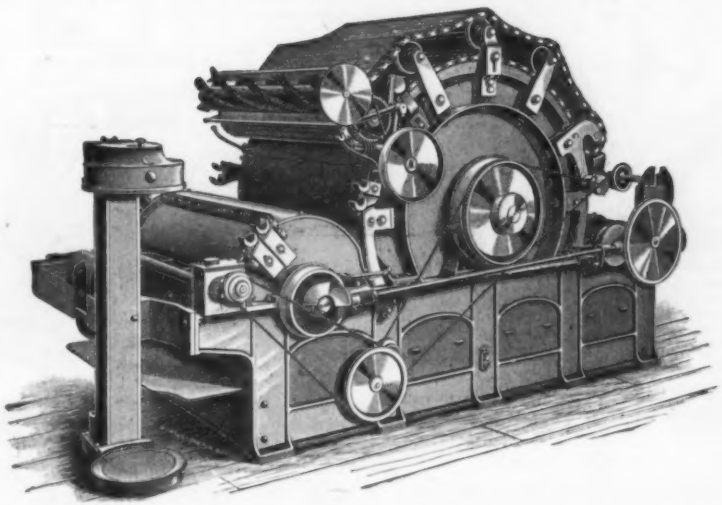

Cards, Combers, Railway Heads, Drawing Frames, Spinning Frames, Mules and Looms,

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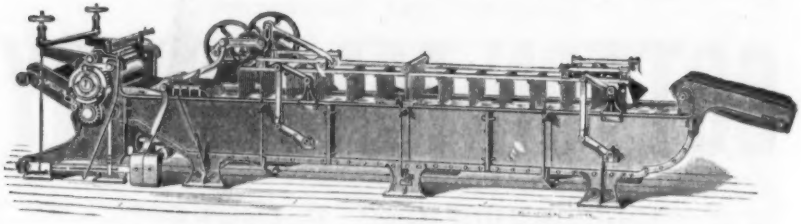
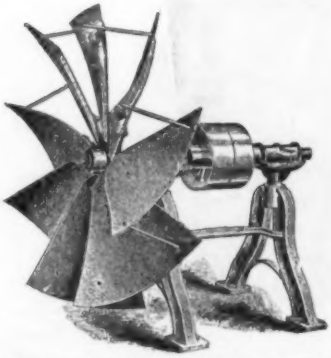


NEW PARALLEL RAKE WOOL WASHER.

In addition to the above, we are the only builders of **Four Rake and Hydraulic Washers.** We guarantee our machines to be the **Lightest Running** and to require the **Least Repair** of any on the market. **Production and results are second to none.**



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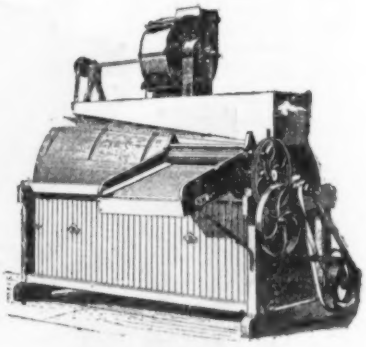
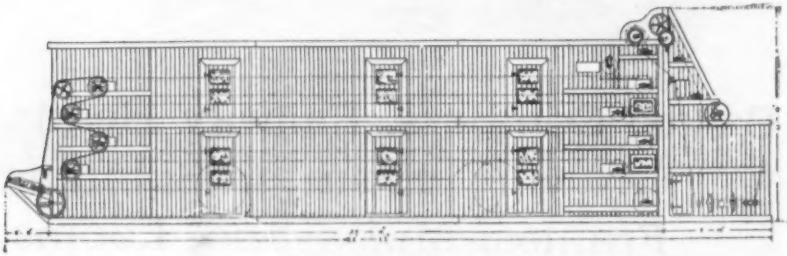


IMPROVED CONE DUSTER.
Exterior View Right-Hand Machine with Fan.



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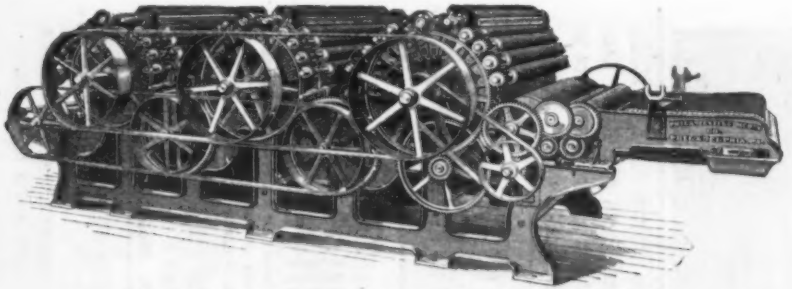

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For Hosiery, Underwear, Yarn, Cotton Stock and Wool.

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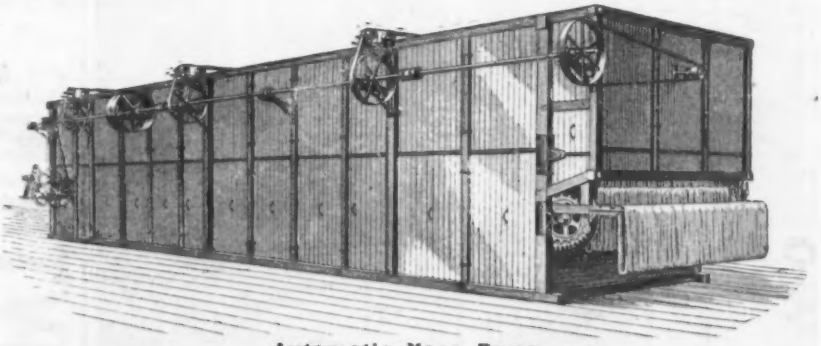

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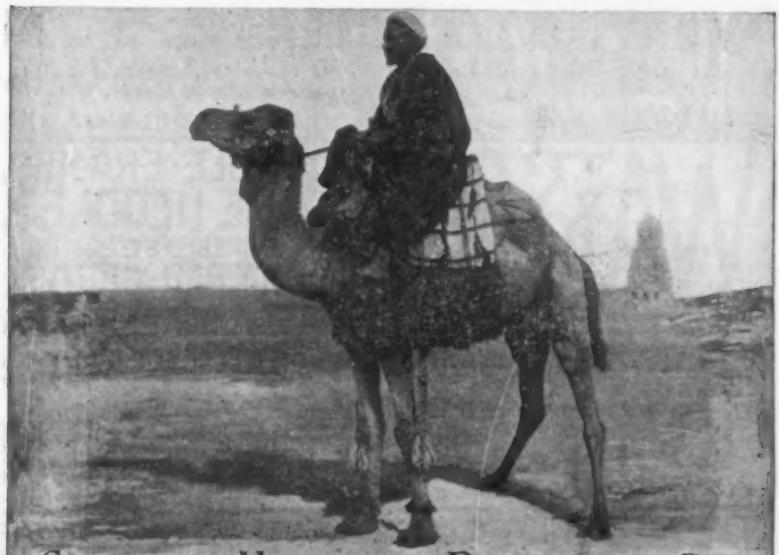

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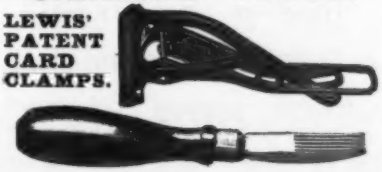

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For Setting Up Bent Teeth of Card Clothing, with a variety of other tools used by Carders and Manufacturers. Send for circular.

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For Cotton and Gingham Mills, Bleacheries, Print Works, Etc.

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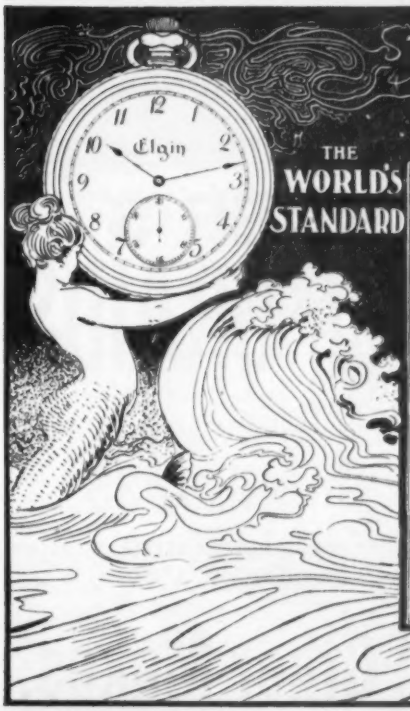

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are especially adapted to the most exacting service under all conditions. While constructed with a delicacy that compels accuracy in time telling, they are scientifically strong at all points to insure endurance.

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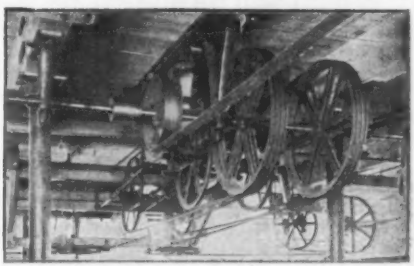

View of two 20 h. p. Rope Drives in yarn mill of W. H. GRUNDY & Co., Bristol, Pa.

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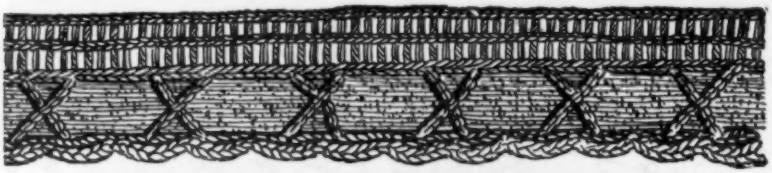

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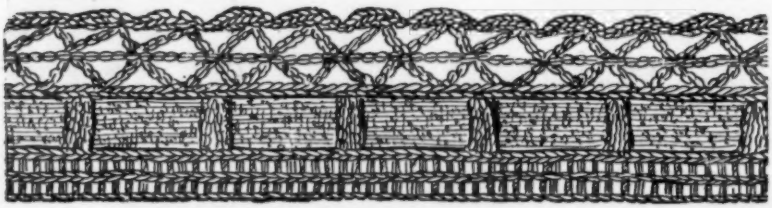

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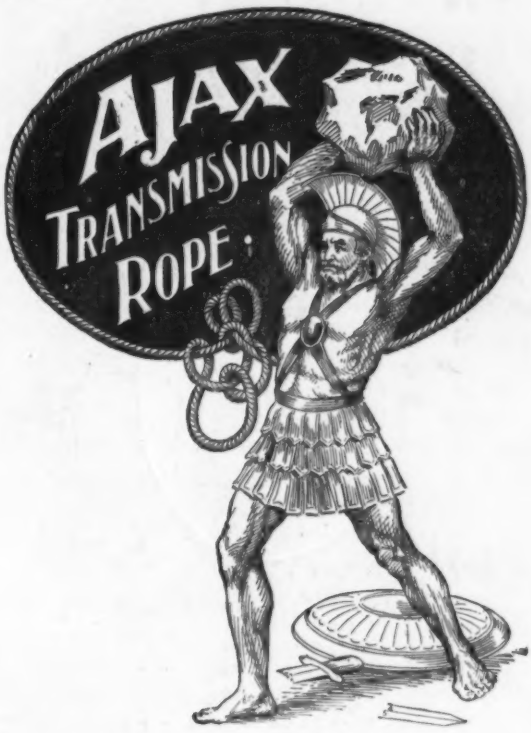

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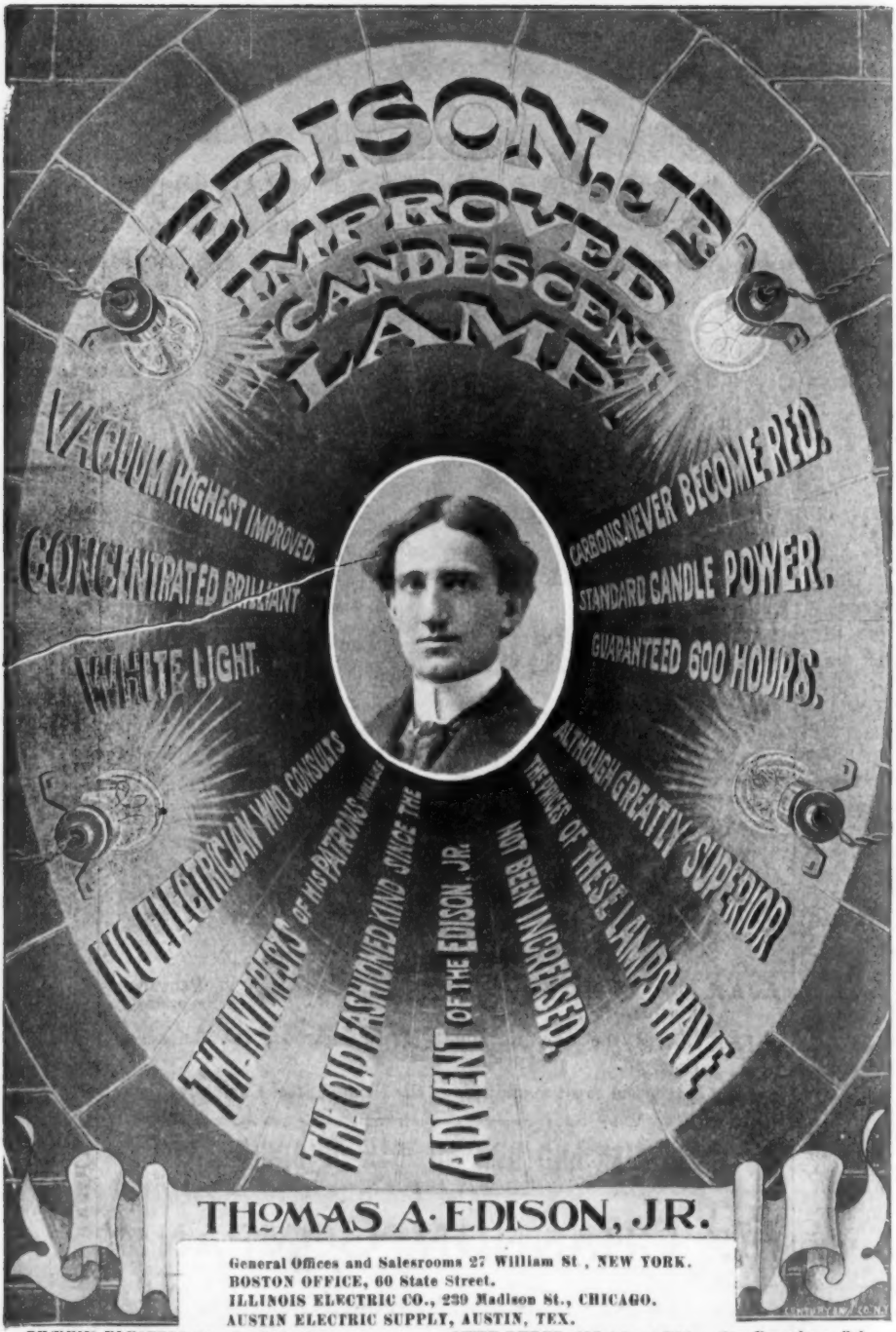

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$2.00 per year for U. S. and Canada.
2.50 per year for Foreign Countries.
3.00 per year with Dyer's Supplement.
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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

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Mr. Van Everen, of our office, was for a number of years an Examiner in the U. S. Patent Office, in the Division of Textiles.

List of Textile Patents.

Issued February 28, and March 7, 14 and 21, 1899.

Braid of Variable Widths, Machine for making. 621,099. Jakob E. Kirberg, Philadelphia, Pa., assignor to Hensel, Colladay Company, of Pennsylvania, Pa.

Card Grinding Apparatus. 620,353. Loren W. Penney, Newton, Mass., assignor to the Pettee Machine Works, same place.

Carding Machine. 621,183. Alexandre Vinchon, Roubaix, France.

Carpet Fabric, Ingrain. 621,522. Thomas B. Dornan and Robert Cuscaden, Philadelphia, Pa.

Carpet Fabric, Woven. 620,104. Richard S. Cookson and Henry Cookson, Philadelphia, Pa.

Chenille. 621,641. Ernst Engstfeld, Philadelphia, Pa., assignor to the Hensel Silk Manufacturing Company, same place.

Cloth Finishing Machine. Rotary Steam. 621,028. Malcolm Campbell, Boston, Mass.

Cloth Margins, Machine for Shearing. 621,301. Gustav Josephy, Bielitz, Austria-Hungary, assignor to G. Josephy's Erben, same place.

Dyeing Loose Stock, Apparatus for. 620,470. George Mallinson, Carolina, R. I.

Dyeing Process. 620,578. John W. Fries, Salem, N. C.

Dyeing Textile Fabrics, Machine for. 620,579. John W. Fries, Salem, N. C.

Humidifier. 620,385. George W. Voelker, Woonsocket, R. I.

Jacquard Machine, Double Action. 620,372. George W. Stafford and Albert E. Kelmel, Providence, R. I., assignors to the Crompton & Knowles Loom Works, Worcester, Mass.

Jacquard Machine, Double Action. 621,544. George W. Stafford and Albert E. Kelmel, Providence, R. I., assignors to the Crompton & Knowles Loom Works, Worcester, Mass.

Knitting Machine. 621,239. Henry M. Foulds, Nottingham, England.

Knitting Machine. 621,478. William Spiers, Leicester, England.

Knitting Machine. 621,681. Will R Johns, Rockford, Ill.

Knitting Machine. 621 723. Charles L. Sturtevant, Washington, D. C., ancillary administrator of Samuel Lowe, deceased, assignor to John William Lamb and Jesse Hind, Nottingham, England.

Loom. 620,861. William Wattie, Worcester, Mass., assignor to the Crompton & Knowles Loom Works, same place.

Loom. 621,138. Eugene Renz, Stirling, N. J., assignor to the Crompton & Knowles Loom Works, Worcester, Mass.

Loom. 621,691. Timothy Mooney and Clement Renaud, Fall River, Mass.

Looms, Electrical Warp Stop Motion for. 621,575. Frederic E. Kip, Montclair, N. J., assignor to the Kip-Armstrong Co., New York.

Looms, Electrical Warp Stop Motion for. 621,594. Wm. H. Baker, Central Falls,

(Continued on page 120)

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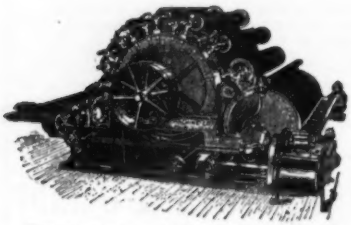

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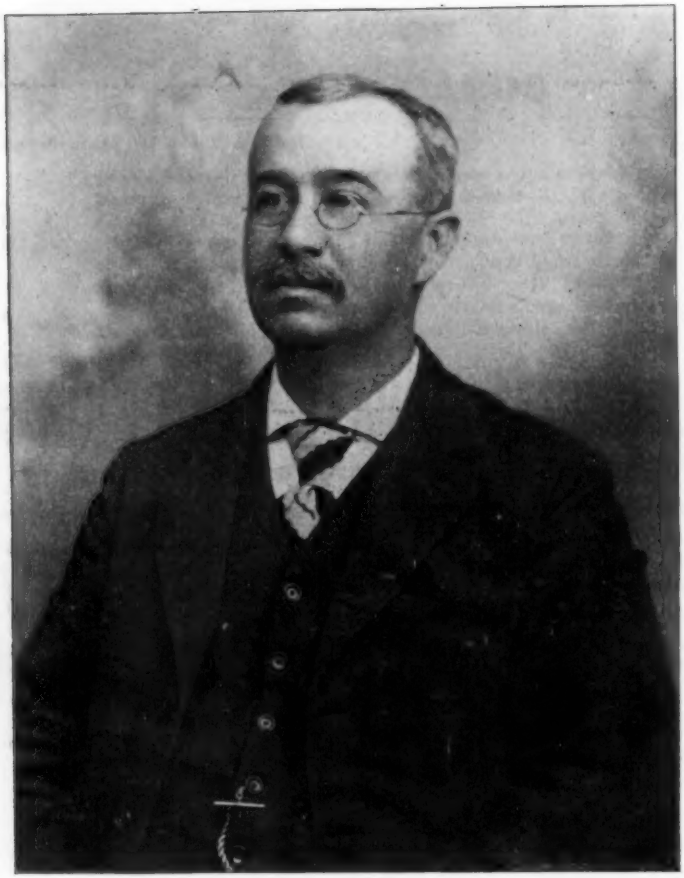


H. D. WHEAT.

TEXTILE WORLD.

Vol. XVI. APRIL, 1899. No. 4.

HIRAM D. WHEAT.

Hiram Dana Wheat, president and treasurer of the Gaffney Manufacturing Company, Gaffney, South Carolina, was born at Saluda Factory, Lexington County, S. C., just across the river from Columbia, on the 6th of August, 1859. He was the only son of B. A. and Sarah Wheat.

Mr. Wheat began working in the old Saluda Factory at an early age, stopping in the winter to attend the common schools of the community, and again resuming his work in the summer, thus gaining the rudiments of an education and an accurate knowledge of the mill business. He made such rapid progress in the textile art that at the age of seventeen he secured the position of overseer of spinning in the Natchez Cotton Mills, Natchez, Miss., where he remained until 1879, when he went to Clifton, S. C., and took charge of the spinning of the Clifton Manufacturing Company. At Clifton, Mr. Wheat formed at intimate association with that prince of Southern mill men, D. E. Converse, president of Clifton and Glendale Mills, from whom he gained much valuable information and assistance. After continuing in successful charge of the spinning at Clifton for four years, Mr. Wheat decided to accept the superintendency of the Morrotock Mills at Danville, Virginia, but was in a few months recalled by President Converse and installed as superintendent of the D. E. Converse Co., at Glendale, S. C., in the summer of 1883. In 1888 he was transferred to a larger field and became superintendent of the Clifton Manufacturing Co., extending his control also over mill No. 2 upon its completion in 1889, having assisted in its erection and directing the placing of the machinery therein. In 1892, Mr. Wheat came to Gaffney, S. C., where he planned, built and managed mill No. 1 of the Gaffney Manufacturing Company, being elected a director and treasurer, and general manager of the company. This was the pioneer mill in the South to run on medium fine yarns, and was so successful as to enable the company to build a much larger mill, known as No. 2, in 1896. In addition to his duties as treasurer of the Gaffney Mills, he was for several years manager of the Tucapau Mills, near Wellford, S. C., which position he resigned in 1896. He has had wide and varied experience in building mills, dams, tenements, warehouses, etc., and in managing help.

In 1897 Mr. Wheat was made president and has since filled the dual position of president and treasurer of the Gaffney Manufacturing Company.

He was largely instrumental in organizing the Gaffney Carpet Manufacturing Co., the first carpet mill in the South, and was elected one of the directors of the company, but has since resigned from this board.

Mr. Wheat is president of the Business Men's League, a director in the National Bank of Gaffney, and was for two years an alderman of the city of Gaffney. He is a Knight of Pythias, having been initiated in Myrtle Lodge No. 3 at Columbia, S. C., in 1880.

Mr. Wheat has also found time to direct the building of an exceedingly handsome Presbyterian Church at this place, to which he gave not only his time, but most liberally of his means.

In June, 1888, Mr. Wheat was married to Miss Anna S. Cannon, of Spartanburg County. They have two interesting children.

The Indigo Decision.

The Board of General Appraisers have rendered their decision in the matter of the protest of Wm. Pickhardt & Kuttroff against the decision of the Collector of Customs at New York as to the rate and amount of duties chargeable on synthetic indigo. This case has excited much interest in the dyestuff and manufacturing circles, and the testimony has been voluminous and most interesting. The article in controversy comes from the Badische Anilin & Soda Fabrik and was assessed for duty at 30 per cent. ad valorem under the provision in paragraph 58, Act of July 24, 1897, for "All colors ground with water or oil or with solutions other than oil, not otherwise specially provided for." It is conceded by the protestants that it was derived from products of coal tar, and in that sense is distinguished from indigo produced from vegetable substances. They contend, however, that it is indigo, having been dealt in and used as such, in large quantities in the United States prior to July 24, 1897, and since, and they therefore claim that it is exempt from duty under paragraph 580 of the present Tariff Act. The Board finds that "the article in question is indigo, and was so known in the commerce, and used in the arts, of the United States on July 24, 1897, and prior thereto. The protest is accordingly sustained."

—It has been reported that an understanding has been arrived at between the Manufacturers' Association and the employees' Textile Council, of Fall River, that hereafter, in the event of trouble in individual mills, these two associations shall each appoint a sub-committee, who shall consider the case jointly, and, if possible, arbitrate the difficulty without a strike. On investigation, we find that no such understanding exists.

—The manufacturers and labor organizations of New Bedford have come closer together, of late, concerning the settlement of any disagreement about wages, to the effect that, hereafter, when any change is contemplated in the schedule of wages, the manufacturers will give a notice of thirty days, and will expect a like notice from their employees. This statement is confirmed to us by those who are in a position to authorize it. In fact, notices to the above effect have been posted in the New Bedford factories.

—A Bradford correspondent writes us that, as a whole, the wool manufacturing industry in the Bradford district, England, is doing fairly well, considering the American demand has been nearly cut off, and that there is a fair fight going on for ousting the French and Germans from the home market, which, to some extent, is of benefit to the domestic trade; still, prices are cut very close, and only the best equipped mills make any money at all. Pure merino wool is the only sort showing any strength, while English wools have been pulled down by the competition of Colonial crossbreds to a lower price than has been known for 68 years. This conforms with the general tendency of prices for the last few years, and it is likely to become more accentuated as time goes on, due to the relative scarceness of merino wools.

—According to the "Advocate," published at Canton, Ga., the first cotton mill in Georgia was established on the Oconee River, four miles below Athens, in the year 1827. This enterprise proved successful, and was soon after followed by many others in the same county (Clarke) and in Green, Richmond and other counties.

NEW JERSEY CORPORATION LAW.

Most of the schemes that are now being incorporated, especially those of trusts and combinations, are floated under the General Corporation Act of New Jersey, as revised in 1896, with certain subsequent amendments and supplements. This act has been found the most convenient, if not the most sagacious, all things considered, of any of our State laws. It certainly meets a popular demand, and accommodates the purposes of those who wish to take advantage of the benefits accruing to the incorporation of a business enterprise.

There are a number of businesses that have received charters, of late, with large capitalization, under the New Jersey act. To enumerate a few of the recent corporations that have been formed under the New Jersey law, other than the American Woolen Company, we may mention the American Ice Company, with a capital of $60,000,000; the Noonday Yeast Company, with a capital of $1,000,000; the Republic Steel & Iron Company, with a capital of $55,000,000, which may possibly be increased to $100,000,000; The Reed Tide Power Company, with a capital of $40,000,000; while plans are being made for the incorporation under these laws (all highly capitalized), of a number of concerns engaged in the manufacture of soap, wire cloth, sheet iron, lamp chimneys, bricks, and the mining of coal.

In order that our readers may know something of the principal features of this law, which is so frequently appealed to, and which is so much in favor, we will say that it has been the policy of New Jersey, since 1875, to attract capital to the State, by the enactment of laws, with special reference to the protection of capital against militant legislation outside of the State. The revision of 1896 was intended to meet the modern tendency of business concerns to incorporate, by recognizing a commercial need for a system of organization of private companies, as distinguished from quasi-public corporations, whose salient features are simplicity of organization and management, and freedom from undue publicity in the private affairs of the company.

The amendments that were made last year were along the lines that have been followed in the English Companies Act of 1862, the distinctive characteristics of which are referred to as, first, restrictive, intended as a "terror to the fraudulent promoter and the tramp corporation"; second, protective, having established a registry office within the State, where the officers, stockholders and creditors of the corporation may go to obtain information which they are entitled to receive, while withholding the same to the tax gatherers of other States, and to outsiders; and third, remedial, giving to the governor and the attorney general discretionary power to remit the taxes of any corporation whose charter had been forfeited by reason of non-payment.

Under this State's law, the scheme of organization, as contained in the certificate of incorporation, is largely left to the incorporators, by allowing them to obtain, within certain clearly defined limits, rights practically equivalent to a special act of the legislature. With respect to the issuance of stock for property purchased, the law has eliminated the question of the value of property, for which stock is issued, standing by itself, and, with the single exception of cases in which there is absolute fraud on the part of the directors, there is no liability upon the holders of stock issued for property purchased. The certificate of incorporation may contain any provision which the incorporators may choose to insert, for the regulation of the business and for the conduct of the affairs of the corporation. It is, in fact, the charter of the company.

There is no limit to the amount of capital stock which a corporation, formed under New Jersey laws, may have, only it is necessary that the

total amount should not be less than $2,000, and that $1,000 of the stock should be subscribed by the incorporators, as constituting the amount of capital stock with which the company is to commence business. The stock is not taxable until issued. As the cost of filing the certificate of incorporation is the same ($25) for any amount of total authorized capital, not exceeding $125,000, it is customary to insert in the certificate, power to issue stock to the amount of not less than $100,000, or $125,000.

Dividends on preferred stock can be fixed at any rate, not exceeding eight per cent. Formerly, the maximum period of duration was fifty years, but, by the revision of 1896, this limitation was stricken out, and the existence of the corporation, if not otherwise stated in the certificate, is perpetual.

The law gives to every corporation power to create two or more kinds of stock, with such preferences and voting powers, restrictions or qualifications as may be thought advisable. At no time, however, can the total amount of the preferred stock exceed two-thirds of the actual capital paid in cash, or property, etc. Preferred stock may, if desired, be made subject to redemption at not less than par. The holders of this stock are entitled to receive a fixed yearly dividend, to be expressed in their certificates, not exceeding eight per cent., as above stated, payable quarterly, half-yearly, or yearly, before any dividend can be set aside or paid on the common stock. The intention of the law is to classify the stock first, as common, or general, without preferences of any kind; and second, stock with preferences. The latter class may be of various kinds, and may be preferred as to dividends, or as to capital, either or both, or otherwise. The preferences as to dividends and guarantees of dividends are contingent, as they can be made payable only out of the net profits of the company.

It would be well to bear in mind that stockholders are liable until subscriptions are fully paid. "Where the whole capital shall not have been paid in, and the capital paid shall be insufficient to satisfy its debts and obligations, each stockholder shall be bound to pay on each share held by him, the sum necessary to complete the amount of such share, as fixed by the charter of the corporation, or such proportion of that sum as shall be required to satisfy the debts and obligations." The subscription to stock and the acceptance of a certificate for shares constitute a contract between the subscriber and the company, by which the subscriber agrees to pay the remaining installments on demand by the corporation. Holders of stock given as bonus are liable on it to creditors, but not to the company.

Those who invest, or take stock in corporations formed under the laws of New Jersey, should have the foregoing clearly in their minds, concerning their liabilities. The laws of that State are peculiar in this respect, and differ most essentially from those of the State of Maine. What we have stated explanatory of the law is taken from the recent decisions of the courts of that State.

Furthermore, it should not be overlooked that nothing but money is considered as payment of any part of the capital stock, except as provided in case of the purchase of property; and this exception is worthy of note, when taken in connection with the combination of different enterprises, of which we have had so many recent instances. A corporation may purchase manufacturing, or other property necessary for its business, and "issue stock to the amount of the value thereof, in payment therefor, and the stock so issued shall be full paid stock, and not liable to any further call, neither shall the holder thereof be liable for any further payment;—and, in absence of actual fraud in the transaction, the judg-

ment of the directors, as to the value of the property purchased, shall be conclusive." We desire to call especial attention to the phrase "judgment of the directors, as to the value of the property purchased, shall be conclusive." This was inserted in the revision of 1896. The precise meaning of the words quoted has not yet been passed upon by the courts, but they have an important significance in fixing the lawful value of properties that are bought, without incurring liabilities for overvaluation. There is a decision of the courts to the effect that where shares are issued for property at a very excessive valuation, the transaction is held to be dishonest, and that the shares are not fully paid, but this decision was made prior to the revision of 1896.

FRAUDULENTLY DESCRIBED WOOLEN GOODS.

There have been efforts, within the last few years, in some of our States, to enact laws preventing the sale of woolen goods as all-wool, when they contain more or less shoddy, or other wool substitutes. Nothing in this direction has been accomplished. The most recent effort that has come to our attention, is the one that has been made in this year's session of the legislature of Connecticut, by the introduction of a bill requiring manufacturers to stamp their goods with some mark, indicating the character of stock entering into their fabrication. The purport of such laws is to prevent imposition upon the public, in the offering of goods as all-wool, when they contain a more or less admixture of shoddy, cotton, etc. Nothing will probably come of this bill in the Connecticut legislature, as it has already been reported upon unfavorably.

There is a law in England, however, that applies, to some extent, to fraudulent practices of manufacturers and others, offering woolen products and misrepresenting their composition, for the evident purpose of deceiving purchasers.

The Bradford Chamber of Commerce has been particularly active in looking up cases coming under the English law, known as the Merchandise Marks Act, and last year instituted legal proceedings against two firms, who had falsely described as "all-wool" certain goods which contained a large admixture of cotton. The first case was against a merchant who labeled and offered for sale as all-wool, certain fancy dress stuffs, which, on analysis, were found to contain over 37 per cent. of cotton and vegetable matter. A conviction was secured in this instance, and a fine imposed of $6.50, including costs.

Another case was made out against a merchant near Leeds, who had labeled and offered for sale as all-wool, certain covert coatings, which were proved to contain over 41 per cent. of cotton, which had been "scribbled in" during the process of manufacture. This latter case excited our attention, leading to certain inquiries on our part, which elicited the following information, obtained from one of our foreign correspondents.

It appears that in this latter case, the commission of an offense against the Act was clearly shown, but, although this was the position of affairs, the existing state of the law made it possible to set up a successful defense, providing proof was forthcoming that there had been no intention to defraud.

The defendant, himself, went into the witness-box and swore to having purchased these particular cloths some years previously from a firm of manufacturers whose traveler represented them to him as being "all-wool" goods. The defendant also swore that he believed this statement to be absolutely true, and had no suspicion of the presence of cotton in the cloths, although, taking into consideration the low price at which they were offered him, he thought it likely that a quantity of shoddy might

have been introduced, the latter material not necessarily containing any percentage of cotton fibres.

There appeared some reason for accepting the truth of defendant's declaration, insomuch as the cotton was not employed, as is very frequently the case, for one series of yarns, where it would have been clearly visible, but had been scribbled in with the wool previous to the spinning of the yarn. At this stage the very important question arose, was it possible for an ordinary merchant to be aware of this combination of material without submitting it to some specific test? microscopic or chemical.

Evidence was submitted by various experts and prominent manufacturers in the district, but more or less conflicting opinions were arrived at.

One of these was that the difficulty of detecting cotton in the patterns submitted depended to a large extent upon both the quantity and quality of the cotton which was mixed with the wool. It might be discovered by untwisting the yarns, or, on the other hand, a chemical analysis might be necessary. It was scarcely to be thought, however, that an experienced manufacturer would take the whole of the patterns submitted to be all wool.

Another prominent manufacturer stated that a merchant of defendant's experience could not detect cotton in the samples; it would require a practical man or the application of a chemical test.

A third manufacturer said anyone might reasonably accept the statement of a manufacturer's traveler regarding the quality of the goods he supplied. What they had to do, as manufacturers, was to try to deceive them as much as possible. He added that the majority of merchants in the trade could not tell whether there was 50 per cent. of cotton in the cloth or not.

Another witness said it was the custom to describe patterns as "all wool" when cotton was scribbled in, and every merchant in the West Riding, he added, knew what was meant by "all wool."

A Leeds manufacturer, in replying to questions, stated that the custom of the trade would justify the application of the term "all wool" to a cloth with five or even ten per cent. of cotton scribbled in, because that quantity was altogether too small to be detected, but a cloth containing as much as forty per cent. of cotton would not be classed "all wool."

Addressing the magistrate for the prosecution, counsel submitted that there was no evidence to show that defendant had adopted such precautions as were necessary to form honest and bona fide belief in the genuineness of the goods under the Act; whilst counsel for the defense contended that according to the Act it must be proved that defendant had taken reasonable precautions or that he had acted innocently. He relied upon the latter portion for the defense.

Other evidence was tendered, and the stipendiary in giving judgment observed that it seemed incredible to him that a man possessing some years' experience in this branch of commerce should be unable to ascertain either on viewing or by textual examination, that cloth composed of forty per cent. of cotton was not "all wool."

However, manufacturers had come forward and stated that, as the cotton had been "scribbled" into the cloth, and did not exist in the character of individual threads, an ordinary merchant might reasonably accept the traveler's statement as to the composition of the cloth, without suspecting its falsity.

As regards the low price at which it had been sold, one manufacturer had gone so far as to assert that cloth of a similar character could be manufactured "all-wool" and sold at even a lower figure than the three shillings quoted by defendant.

In the face of all this, and also of the defendant's sworn testimony, he

came to the conclusion, though not without some misgiving, that he ought not to hold that defendant had any reason to suspect the genuineness of the description applied by him to the samples in question.

Had the trade evidence led him to the conclusion that the defendant must have suspected the presence of cotton, even though it occurred in the smallest quantity, he would certainly have held that his omission to adopt all reasonable measures to dispel or justify that suspicion would be amply sufficient to bring him within the penal provisions of the statute. It seemed, however, from the evidence of witnesses, that there was nothing to put him "on inquiry" in the matter.

He felt strongly that this result indicated an urgent necessity for material amendment of the statute, if it was to afford any real protection to purchasers. The verbal representations made by the manufacturers, or their travelers, did not come within the Act at all, and he thought it desirable to bring them within its scope, or to render the merchants and dealers themselves responsible for false representations made by them, unless they thought fit to obtain a written guarantee from the manufacturers which would protect them. He was glad to observe that one of the leading manufacturers repudiated the existence of a custom which had been referred to, viz.:—that of describing cloth as all wool, however much cotton it may contain, so long as that cotton is scribbled in, and does not exist in the distinct form of threads. Therefore, for the reasons he had given—the information must be dismissed.

Counsel for the prosecution said he should probably ask to be allowed to raise the point in appeal, that the plea of bona fide was nothing, unless ordinary precautions had been observed; and no evidence existed here that such a step had been taken, because he thought that if the failure of the Act to meet certain cases was true, it was most desirable that this case should be thoroughly investigated. Up to the time of writing, however, the foregoing remarks indicate all that has transpired. The desirability of an appeal which would more clearly establish the relative responsibilities of merchants and manufacturers, is undoubtedly very apparent, and the sooner some distinct understanding is arrived at, the better.

TEXTILE SCHOOLS IN MASSACHUSETTS.

In our March number we gave the status of the bills before the legislature at that time, affecting the textile schools in this State. It is unnecessary for us to repeat what we then said. Some modifications have been made in the bills that were first reported and referred to the committee on education.

The bill for the establishment of a school at Fall River has been modified, so as to allow that city to incur an indebtedness of $50,000 for the purpose of acquiring land for a textile school, and constructing and equipping a suitable building for it; but nothing in this bill is to be construed as authorizing the payment from the treasury of the Commonwealth of any sum "in excess of that authorized by the statute in such cases." The meaning of the part quoted will be better understood if it is stated that the law of 1895, under which the Lowell and New Bedford schools were established, has been revived, so that there shall be no favoritism, permitting Fall River to receive all of the advantages of such a law, the same as were extended to New Bedford and Lowell. The State can only appropriate $25,000 the first year, but may, of course, make additional appropriations each subsequent year, if it thinks best, as has been done in the case of Lowell. Therefore, the present bill, affecting Fall River, while it enables the city to raise $50,000, does not authorize a larger sum than $25,-

000 to be appropriated from the State treasury.

The bill relating to the Lowell Textile School authorizes the payment from the State treasury of $18,000, with the condition that no portion of this amount is to be paid until satisfactory evidence is furnished that an additional sum of $7,000 has been paid to the trustees by the city of Lowell, or received by them from other sources, with the further condition that the yearly tuitions at the school, from its pupils who are non-residents of the State, shall not be less than $300. This $7,000, of course, can be raised among the corporations, or anywhere else, if not from the city itself; but, in order to get $18,000, it must come from some quarter and paid to the trustees. We learn, however, that these sums may be changed to $20,000 and $5,000. That non-resident pupils should pay more than resident pupils, appears on the surface to be nothing but fair. This practically means that the students out of the State will have to incur an expense of $200 more per year than those that live inside of the State.

It would be nothing more than equitable, it seems to us, if the State of New Hampshire should contribute something to the financial support of this institution, as its manufacturing industries are as much benefited as those of Massachusetts, especially those which are located at such places as Manchester, Nashua, and other points easily accessible to Lowell. They are benefited more than those in the western part of Massachusetts. Lowell is as centrally located for such a school as it is possible to make it, for the textile mills of New England. This school contributes more essentially to the southern section of New Hampshire than to even the southern section of Massachusetts. Why, then, cannot the legislators of New Hampshire be made to see the equal importance of their voting money for the support of this school, as the legislators of Massachusetts?

PROMOTERS.

At the present moment, promoters of trusts and combinations are as thick as grasshoppers in harvest time. In many instances, they are meeting with excellent success, in securing fat commissions for themselves. Their methods are simple and effective, one of which is to get corporation papers and preliminary prerogatives for the incorporation of some branch of an industry, which seems to offer favorable features for the promotion of a scheme for its consolidation under one management. With these preliminaries, they set to work among those whom they think will be interested in their scheme, and usually make a favorable impression, for the time being, at least. They seldom fail in securing an audience long enough to get the parties that they interview to consider their project, and attend, at least, one or two meetings.

Though the proprietors of the several concerns to be consolidated may declare that they are able to do their own organizing, they are at once met with a plausible plea that the plan for them to follow has already been consummated, and ready to be put into operation; the promoters being quick witted enough to see the importance of having all of these arrangements made beforehand, to meet any objections of this nature. The thing has been done, and all that is asked of the proprietors is to sign away their property, or allow it to be merged into a corporation, for a consideration, which is already formulated for their acceptance. The promoters are frequently smart enough to gain their point, and, finally, their commission.

Promoters have been long recognized as factors in enterprises of this kind. They are known in England, and several court decisions have been made respecting their status. A promoter has been defined by one of the justices of the English court as holding a certain indefinite position in transactions of this sort. The opinion of one justice is: "The term promoter involves the idea of exertion, for the purpose of getting up and

starting a company, or what is called floating it, and also the idea of some duty towards the company imposed by, or arising from, the position which the so-called promoter assumed towards it." According to another English court ruling, it is not asserted that the owner of property might not promote and form a joint stock company, and then sell his property to it, but if he does so, "he is bound to take care that he sells it to the company through the medium of a board of directors, who can, and do, exercise an independent and intelligent judgment on the transaction, and who are not left under the belief that the property belongs, not to the promoters, but to some other persons."

FALL RIVER MILLS.

The recent circular of W. B. M. Chace & Co., Fall River, giving certain statistical exhibits, relating to the financial condition of a number of the cotton corporations of that city, whose shares are traded in more or less, have excited considerable attention. During the past few years, many improvements have been made in the equipment of most of the Fall River mills, so that it is now considered that the plants in general are in a better condition to meet competition than for some time past.

Of the thirty-one mills referred to in the statistics, eighteen have a net debt on their plants, and thirteen a surplus. The aggregate net debt amounts to $2,702,629, and the surplus to $1,064,964, showing a debt larger than the surplus, of $1,637,665. This shows a debt over the surplus of 8.1 per cent. of the capital ($20,275,000), of the mills named. The number of spindles in the 31 mills is 2,243,004, giving the debt over the surplus at 80 cents per spindle. It also appears that six of these mills have none but ring frames, while 25 mills have both mule and ring frames. Of the 2,243,004 spindles, 743,148 are mule and 1,499,856 ring spindles.

It is noted that with some of the mills with a surplus, their shares sell on the market less than par, while some of the mills with a debt have their shares selling above par. For instance, the shares of the American Linen Company, having a surplus of $18,000, sell for $5 below par, while the shares of the Chace Mills, with a debt of $187,625, sell for $10 above par. Several instances of a like character could be named. There are, however, many things that affect the selling price of the shares of the different mills. Some of the shares that are selling below par are worth a great deal more, based upon the earning capacity of the mill. The low selling price is due largely to the non-payment of dividends from the earnings, which are kept for other purposes. While the Chace Mills have a large debt, they also have a very large plant for their capital, which is looked upon as a good reason for their shares selling above par, which are also affected by the fact that the mills pay dividends. For very much the same reason, the shares of the Davol Mills command a price $4 above par, notwithstanding a net debt on their plant of $74,000.

TEXTILE COMBINATIONS.

Very little that is new can be related concerning the various movements that have been talked over for the combination of mills in some corporate capacity. The term trust can hardly be applied to these projects, as the American Woolen Company is a veritable corporation, though its permanency is looked upon with much incredulity, and something that is quite likely to come to an end when a depression overtakes the trade, as it surely will in the usual course of events.

None of these combinations are regarded with any favor by those in the trade, as they possess many dangerous elements detrimental to the stability and prosperity of manufacturing. It can hardly be said that any one of these schemes can be made so powerful as to become a monopoly, though it must be admitted that they will be able to exercise potent influ-

ence in regulating the prices of commodities, and at times so depressing prices, for the purpose of unloading an accumulation of stock, as to have a ruinous effect upon mills of smaller capacity.

We hear nothing more about the shoddy and low grade woolen trust, which approximates more nearly to a trust than anything that has been recently agitated. The Maine woolen mills are apparently in a state of uncertainty what to do, but the general inclination is to hold on to individual mills, and not enter into a combination; although, of course, inducements are possible, which will change their sentiments very materially. How far the so-called National Woolen Company will effect a change in opinion, it is not easy to say. It is extremely doubtful if this latter company will ever get beyond its present preliminary stage and become a factor of any importance in the woolen industry.

The knit goods combination, as alluded to elsewhere in this issue, shows plenty of activity in the way of talk, but probably that is as far as it will get, although it is impossible to tell what things will happen nowadays, as the impossibilities of six months ago have been made realities within the last month.

The United States Dyewood & Extract Co., although it has an existence on paper, we learn, from those who have been mentioned as having joined it, has an extremely doubtful status, and is not looked upon as likely to be carried through. The fact that corporation papers have been obtained by promoters, is nothing but the customary method practiced by this class of people. It is very easy to obtain charters, and we would refer our readers to our editorial on "Promoters," how these are obtained. Worsted yarn spinners show a disinclination to join forces, although there is a willingness to talk over the matter, and if spinners are offered sufficient inducement to sell out, of course there is an opening for a purchase and combination.

Fine woolen goods mills have not come to the point of agreeing to any combination scheme, and the project is not looked upon with favor.

—The idea of the inefficiency of negro labor in cotton factories has not yet been given up, notwithstanding the unsatisfactory experience with such help in some of the Southern mills. Some of the most level headed and oldest manufacturers in the South have shown their faith in the efficiency of this kind of labor, by investing in the new capital stock of the Charleston Cotton Mills, which will soon be in operation with negro help. A charter has already been applied for, for the incorporation of a cotton mill at Jackson, Miss., with a capital of $250,000, to be owned and operated by negroes. Of course, the success of this enterprise with negro help is a serious problem, but one that we have predicted would have to be solved sometime, as a scarcity of white laborers is to be anticipated, though we did not expect anything of this kind for ten or fifteen years yet to come.

The Treasury Bureau of Statistics, Washington, D. C., has just published a sheet showing the value of imports and exports into and from the United States, from 1789 to 1898, which gives quite an insight into the great progress that has been made in the commerce of this country. In 1790 the value of imports of merchandise was $23,000,000, while in 1898 it amounted to $616,000,000. The exports, in 1790, were valued at $20,000,000, and in 1898, at $1,200,000,000. The total commerce of the United States, from 1789 to 1898, as represented in the value of the imports and exports of merchandise, amounted, for that period, to about $61,000,000,000. Since 1875 there has been an almost steady excess of exports over imports, till in 1898 this excess reached over $615,000,000.

—Turmeric dyes all fibres without the aid of a mordant, and is thus one of the very few natural substantive dyes.

Conditioning Silk.

The Silk Association of America has quite recently taken up the question of establishing rules for silk conditioning in the sale and purchase of the raw material. To this end, the association issued circulars last February, to silk manufacturers, and to those engaged in the buying and selling of raw silk. Quite a number of favorable replies have been received. According to the views of the association, the ultimate solution of the matter rests with the buyers, rather than with the sellers of silk. So far as known, the sellers of raw silk, in the New York market, at any rate, are not averse to basing their sales on conditioned weight and conditioned sizing.

With this understanding, it is recommended that the following plan be adopted: All contracts for raw silk purchased in the New York market after May 1st next shall be based on conditioned weight, such weight to be established by conditioning not less than one bale out of five of the lot purchased.

The cost of the operations to be the same to all comers, viz:

	Now proposed.	Former charges.
Conditioning, per bale.	$1.50	$2.00
Bales, 150 to 300 lbs.....	2.25	3.00
Boiling off, per test.....	1.50	2.00
Boiling on conditioned silk, per test.....	.75	1.00
Sizing, per test.....	1 50	2.00

Former charges on all other operations to be correspondingly reduced; the conditioning charges to be payable in accordance with the established custom, viz: buyer and seller each paying one-half.

In this connection, it may be well to say that the term "silk conditioning" conveys no idea of the process to which it is subjected. Therefore, a brief explanation may not be out of the way, showing what conditioning is, why it is done, and how it is done.

Importers and manufacturers no longer work by the old established rule of the thumb. Every article of Nature's gift or of human product must now be tested and analyzed for the purpose of finding out its real value on the one hand, and on the other, the extent of its adaptability for the purpose to which it is to be put. All textile fibres, it is well known, have great hygroscopic propensities; i.e., absorb water freely. This is especially true of silk. In its greatest state of dryness it contains no less than eight per cent. of water, and is susceptible of containing 15 per cent., without showing signs of moisture, and as much as 25 per cent., without its being easily detected. This property of silk, to absorb moisture to such an extent, presents great inconveniences from a commercial point of view. The difficulty arises from the fact, that, as the reeling of silk starts with the rainy season, it is impossible when the silk arrives in this country to estimate the amount of moisture which it has absorbed in the damp climate of Japan and during its ocean voyage.

The result is, that manufacturers who employ this delicate material are exposed to errors in the calculation of the cost price because of the loss of weight in the raw material, when going through the different processes of manufacture. The aim of conditioning is to determine the exact percentage of moisture absorbed by the silk, thereby greatly facilitating business operations and rendering it impossible for unscrupulous dealers to pass off water as silk.

The operation of conditioning is not a complicated one. The best way to ascertain the amount of moisture contained in a fibre is to render the fibre perfectly dry, the difference between the original weight and the weight after dessication gives the amount of water.

If the conditioning of silk is indispensable to the trade, the determination of the size of the thread is a matter of no less importance. A direct measurement is out of the question, and the way universally adopted is to ascertain the weight of a given length of thread. The test is made generally on five skeins taken at random out of

a bale. The five skeins are placed on a winding machine, so as to put on bobbins a length of thread sufficient to make the test, and, during the operation, note is taken of the working of the silk. The result is given on the conditioning certificate by one of the three following quotations: Winds very well—Winds well—Not a good winder. The bobbins are then placed on the sizing machine, and from each one four skeins are reeled, making twenty altogether. Those twenty small skeins are weighed individually, and the average weight is accepted as the size of the bale. For raw silk, the skeins are made 476 meters long, and their weight ascertained in deniers; for thrown silk the test is made in drams on skeins of 1000 yards; and for spun silk in drams on skeins of 840 yards.

Decreusage, or boiling off, is the process or analysis by which the exact percentage of over-weight (gum, soap, grease, etc.), contained in silk can be ascertained. The skeins are first placed in the dessicating apparatus to obtain the net absolute weight of the silk to be tested, then boiled twice in a bath of boiling soapsuds, rinsed, dried and conditioned again. The difference between the absolute weights before and after boiling gives the true over-weight of the sample tested.

It can be easily understood how indispensable decreusage is for every silk manufacturer, to determine accurately the weighting that is to be used on the silk by the dyer, and arrive at the actual cost of the silk before it is put on the loom.

Knit Goods Combination.

The knit goods manufacturers of the Mohawk River Valley, New York, have had presented to them, a scheme for the consolidation of their business interests, into one combination, or corporation. This has been suggested in years past, but nothing has ever been evolved out of it, because of the diversified interests involved, and the financial status of the different mills, themselves, to say nothing about the disinclination of individual establishments to lose their identity in one great corporation. Manufacturers, however, are becoming more and more familiar with the idea of combining their interests, and they have had presented to them many instances of the practicability of schemes of this kind, which makes them more inclined to favorably consider any proposition that may be presented to them, that has a plausible outlook.

The fact is, competition is too strong, and at present it is said there are in the Mohawk Valley, some factories which are selling their goods at a sacrifice, in order to meet competing products. This state of affairs, of course, is intended to be rectified by the proposed combination, at the same time keeping the ruling prices for goods where they are, the profit being maintained in the reduced cost of production and other savings.

It is alleged that mills are now obliged to incur uncalled for expense in maintaining complex machinery. Probably between forty and fifty different kinds of goods are gotton out, some white, some colored, some plain, and some fancy. Separate machines must be used in each mill for this, or if not, machinery used for the manufacture of colored wear must be cleaned before it can be put on other grades. Under the trust this, it is thought, could be avoided, as a certain line of work would be assigned to each mill.

Still another object is to save the commission now paid to the middleman, and this is to be done by dealing directly with the trade from the factories. The trade, it is calculated, would get the benefit of this, as the trust could afford to give it the advantage of at least part of what the middleman now gets.

The late movement, towards a consolidation, has been due to the efforts of John W. Baker, of Philadelphia, who sent invitations to all of the knit goods manufacturers, to meet at the

Waldorf-Astoria, New York City, March 15. This meeting was held, and a number of representatives were present from the mills.

Robert Mackinnon, Little Falls, was elected chairman, and Charles T. Broughton, manager of the Star Knitting Company, Cohoes, acting as secretary. Mr. Baker, the promoter, stated he estimated that at a low valuation $25,000,000 would be invested in any such combine, which would represent a production valued at $50,000,000. The cost of production would amount to about $17,000,000, and it would be possible to save at least 20 per cent. of this amount.

Among the savings is the increased economy in buying and selling, the consolidation of plants, the closing of those which were not necessary for the success of the company and the manufacture by individual mills of the character of goods which they are especially adapted to make.

In his remarks in calling the meeting to order Mr. Baker claimed that not only was the present condition of the knit goods industry very much demoralized, but that there was no hope of it improving unless some radical steps were taken to do away with present evils. The greatest menace to the trade was the sharp competition it had to contend with, and if this could be stopped, and they could better their condition by economizing, there was no doubt of success. For instance, if one mill could be confined to manufacturing that kind of goods for which it was best equipped, and thus do away with the constant changes and consequent loss in making different kinds of goods, a great saving could be effected. In the distributing end, also, more economical methods could be adopted by selling the goods under one roof and with fewer salesmen. By buying large quantities, raw material could be had at lower prices, and in many ways a great amount of money could be saved. The idea was not to raise the price to the consumers, but simply to put the industry on a paying basis again.

It was further suggested that the plants could be controlled in one of two ways: Either the manufacturer should sell out direct to the trust and receive cash, the manufacturer to agree to retire from the underwear business for at least fifteen years, or the manufacturer could turn in his plant to the parent company and accept the equivalent in stock, two shares of common stock being issued to every one of preferred. Those who compose the company, Mr. Baker suggested, should issue common stock for the operation of the combined company. It was thought that not more than $5,000,000 of quick assets would be needed as working capital. It was also said that 25 per cent. of the value of the mills making flat underwear would be sufficient for a working capital.

After discussion by those present it was finally decided to appoint a committee of seven, who should gather statistics regarding the different plants to be associated, upon which data options could be secured. The committee appointed was as follows: Wm. H. Rowe, of New York, representing mills in Troy, N. Y.; Wm. S. Van Brocklin, Amsterdam, N. Y.; Chas. A. Bailey, Little Falls, N. Y.; Chas. Cooper, Jr., Bennington, Vt.; Quentin McAdam, Utica, N. Y.; John H. Pynes, Waterford, N. Y., and John E. Hannifee, Philadelphia.

The meeting adjourned subject to the call of this committee.

Knit goods manufacturers, about Amsterdam and Troy, view the feasibility of a combination of this kind from different standpoints, many of the views, no doubt, being influenced by the business interests and conditions of those expressing them. W. H. Rowe, of the Wayside Knitting Company, expresses himself very enthusiastically at the outlook, and is emphatic in the belief that the combination may be organized with a large number of mills.

It is reported that Hon. Titus Sheard, of the Eagle Mills, Little Falls, is one of the prime movers in

the present scheme to consolidate the flat goods knitting mills, but that for some reason, he prefers to remain in the background. It is also rumored that ex-Governor Roswell P. Flower is not unwilling to unload his mills at a price.

A well known and successful Utica manufacturer says that there is considerable opposition to it and that there is some question as to the successful consummation of the plans. The same dealer stated that the movement was started at the instigation of some of the factories which have not shared in the success which has attended the operations of the majority of the plants. Many of the manufacturers, he said, have been very foolish this spring. They have gone all to pieces, to use a common phrase, and have allowed the buyers to demoralize them.

Charles F. North, of the Anchor Mills, is reported as regarding the plan as too visionary and would fail when put to a practical test. Then besides there were many men in the business who would want to dictate the policy of the trust. All could not rule, so some were bound to be disappointed and would get out in consequence.

James H. Shine, of the Hope Mill, expressed himself as favorable to the organization among knit goods manufacturers. He thinks that the many evils which now disturb the trade could be thus prevented.

Charles Bailey, of the Little Falls Knitting Mills, is quite sanguine regarding the result of the present movement, which, he thinks, will be beneficial to manufacturers.

From one quarter, we learn, that the outlook for the combination is not so promising as it was at first, and it is said that the committee appointed to get figures from mill owners and place a value on plants, is not having the anticipated success. Those who are making money now, and most are, do not care to sell, while those who have non-paying plants are red hot for a combination, which means to them a sale. The committee has encountered these adverse conditions, and is puzzled how to reconcile them.

The advisory committee met on the 23rd of last month, and discussed informally the present state of affairs, and decided by a unanimous vote that a general letter be sent to all interested mill owners, and as soon as replies to these letters are received, another meeting of the committee will be held to decide upon the future course of action.

Cleansing Wool.

THE MORSE WOOL TREATING PROCESS.

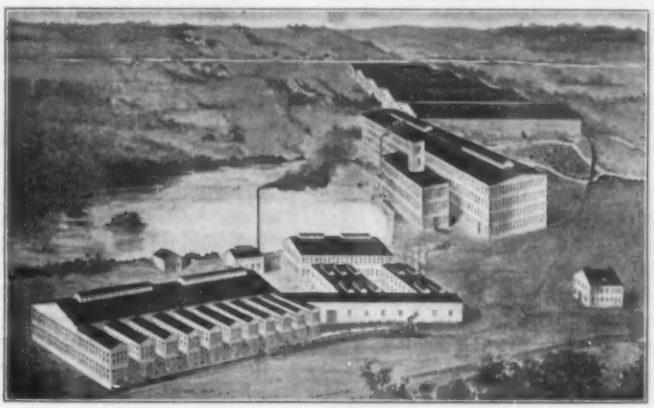
The beginning of the successful manufacture of wool into yarn and fabrics is the proper cleansing of the fibre from all impurities, or extraneous matter, without injury to the scales or cellular structure of the fibre itself. The physical properties of the fibre should be preserved during all of the processes through which it passes, from the initial cleansing to the finished product, if perfect results are to be attained. Although this is self-evident, it is none the less true that little attention has been given to the preservation of the essential characteristics of wool, by the manufacturer, but that its earliest and most vital treatment is given into the hands of ignorant persons, who are still further obliged to use methods known to be deleterious in their effect upon the fibre.

Most of the wool that is used for our woolen goods is received in our mills with from 30 to 70 per cent. of extraneous matter, which, however essential it may have been for the healthy growth of the fibre on the animal, must be removed before the wool can be utilized in any of the processes of manufacture. This foreign matter consists of dirt and the natural perspiration, known as yolk, or wool grease, from the body of the animal.

Heretofore, manufacturers have contented themselves with simply securing the fibre cleansed from impuri-

ties, without any thought being given to the valuable properties that are contained in the yolk. Though this latter has been long recognized as being of great importance for commercial and pharmaceutical purposes, its several parts have not been utilized to any great extent, because the methods for its collection and separation involved too great an expense, though efforts have been made to bring this onto a profitable basis for the last forty years, at least; during which time, mechanical devices have been invented for cleansing wool with volatile liquids of the hydro-carbon class.

There are important desiderata to be considered in freeing wool from its impurities. The scouring process should be as mild as it is possible to make it, for the efficient removal of the grease. In order to do this, there are only two known methods—the emulsion and the solvent. The former has usually been employed in connection with an alkali, as soda ash, the fatty matter in the wool forming an emulsion with an alkaline solution. This process has been in long use, and is familiar to every manufacturer, the only advantage of which is its cheapness and safety from fire. Its disadvantages are numerous and have been frequently called to the attention of those using it, as liable to be of great injury to the fibre, in seriously impairing its physical structure. So subtle, however, has been the destructive nature of the alkali upon the fibre, that it has remained unobserved, except when subjected to examination under a microscope. Doubly has been the detrimental effect of the alkali, if used at a high temperature, which is very apt to be the case when the operation of scouring is placed in the hands of ignorant help, as is usually done. Caustic alkalies, such as are used for scouring wool, cannot be used effectively, except in a solution at a high temperature, which can readily become so intense as to completely dissolve the wool. Not infrequently this is carried to such a degree that partial dissolution does take place. The temperature of the alkaline soap bath used in scouring wool, should never exceed 110 deg. of heat, if all of the valuable properties of the fibre, especially the lustre, are to be preserved. Now, it is known to be a fact that the temperature is more often used in excess of this.



MORSE WOOL TREATING WORKS, NORTON, MASS.

The essential qualities of the wool fibre, to the manufacturer, are its softness, strength, lustre, and elasticity. All of these are detrimentally, if not perceptibly, affected to a more or less extent by the use of caustic potash or soda, or any alka-

line solution. On the other hand, they are not affected, but preserved, by the hydro-carbon, or volatile liquid, process, which also leaves the fibre unimpaired as to its felting properties, simply because its physical structure is not changed.

The difficulty, heretofore experienced, in the practical working of any plan for the utilization of hydro-carbons for cleaning wool, has been because of its mechanical inefficiency and method. It is a well known fact, however, that wool cleansed by hydro-carbons, works with considerable less waste, and can be spun into finer counts, than when cleansed with soap and water.

Quite a number of inventions have appeared in recent years, for overcoming the difficulties attending the use of volatile liquids for cleansing wool, but none of them have proved successful, to our knowledge, unless it be the one to which we shall especially refer, as the invention of John T. Morse. Even in the late publication of Knecht, Rawson & Lowenthal, reference is made to the numerous attempts towards the cleansing of wool by a volatile solvent, which, although theoretically giving good results, not only with regard to the washing, but also to the complete recovery of the by-products, have been tried and found to answer well only on a small scale. "On a large scale, practical difficulties have always shown themselves, in consequence of which, none of the methods has hitherto been able to hold its own against the old process of washing with soap."

From our personal investigation of the Morse process, we have no hesitation in saying that the main difficulties in the use of volatile solvents have been overcome to a sufficient extent to make it commercially successful for the cleansing of wool, and for the separation of the by-products for economical utilization for pharmaceutical and other purposes.

The great drawback in the use of the solvent process, heretofore, has been the danger from fire or explosion. This danger removed, makes the process the cheapest and the best that can possibly be devised, so far as chemistry has enabled us to see. In the Morse process, if properly carried out, this danger has been, we are satisfied, wholly eliminated.

By the use of the hydro-carbon, or solvent, process, we desire to impress upon our readers that no deleterious effect on the fibre need be feared. The fibre cannot, by any conceivable means, become impaired, through any carelessness on the part of ignorant workmen, and the manufacturer, therefore, has his wool given to him in a condition as perfect as the nature of the fibre will permit. With these conditions, it is readily seen that a fabric can be produced that is susceptible to a finish with all the natural characteristics of the wool preserved. The manufacturer will obtain by using wool that is thus cleaned, less waste, greater fineness and strength of yarn, no loss in the natural lustre of the fibre, greater purity of colors, greater suppleness, or, in other words, a more perfect production. All of the advantages above referred to in the use of hydro-carbons, for cleaning wool, we believe are represented in the process for treating wool which we have been privileged to carefully examine in its practical operations, as carried out by the Morse Wool Treating Co., of Norton, Mass. By this process, wool can be treated in the open state, or in the original package, as may be most desired. So thoroughly and cheaply is this done for manufacturers, that it is a question whether the latter can find it to their advantage to cleanse their wool themselves.

By the Morse process, the wool is conducted into what is termed a treating cylinder, into which is introduced a refined hydro-carbon solvent, filling the cylinder, after a vacuum has been created, thoroughly penetrating the mass of wool, and extracting all of its wool grease. The removal of the air from the cylinder, eliminates all possible danger of fire or explosion. The vacuum also enables the solvent to

perform its functions more effectively. While in the cylinder, the solvent is subjected to a cold expansion process of great efficiency, for the purpose of permeating every part of the wool mass, no matter how compact it may be, whether baled in the original package or otherwise. After the solvent has performed its functions, it is drawn from the cylinder, carrying with it the wool grease to separating stills, where it is vaporized and afterwards condensed, and delivered back to its original starting point. All foreign matter, including wool grease, obtained from the wool, is collected and separated, and the grease barrelled for shipment, to be afterwards manipulated for pharmaceutical and other purposes. After the wool has been treated with the solvent it is removed from the cylinder and passed through a deodorizing process where it is subjected to a treatment of steam combined with air blown through it sufficiently to break the steam. This leaves the wool in a remarkably sweet condition and in this shape can be shipped to the manufacturer that sent it, to be afterward washed, or the Morse Wool Treating Company will perform all of this operation, if desired. If the wool, however, has been treated in the original package, and is expected to be returned in that form, the deodorizing process will have to be done at the mill where the wool is used. This process can be effected with inexpensive machinery, that hardly need be taken into consideration, so far as its cost is concerned, by the manufacturer.

The capacity of the Morse Wool Treating Company, at Norton, Mass., is to be so extended as to enable it to treat 100,000,000 pounds of wool in the grease, per year.

Other stations than the one at Norton are soon to be established; one at Lawrence, Mass., one at Philadelphia; one in Indiana; one in the northern part of New York; and two on the Pacific coast. The officers of this company are: Augustus Clason president, and John T. Morse, treasurer and general manager.

The Silk Industry.

The silk industry of the United States has made great progress within the last ten years and especially within the last year or two. The census of 1900 will have a much fuller report to make in regard to this industry than ever before. It is perhaps the only one of all of the textile industries that will show, on the basis of present prices and conditions, a real advance in the value of the manufactured product. Not only has the silk industry increased its general output, but the aggregate value of its product exceeds by far any decline that has taken place in prices. The cotton and woolen industries cannot make a similar showing, as we think will be demonstrated in the statistics of the coming census.

The most important annual meeting that has ever been held by the Silk Association of America, was its last one, on March 28. New features have been introduced into the administration of this association within the last year, under the management of its able secretary, Franklin Allen. The association is particularly fortunate in being able to command the services of so efficient a secretary, from whose annual report we make brief abstracts, as follows:

The year 1898 has been an eventful one in the history of the silk industry of America. It has witnessed the first year's operation of the Dingley tariff act. The classification of imports by the United States Bureau of Statistics under the Dingley tariff act is much superior to the former classification. Instead of by commercial designation only as articles, the present classification presents separately, fabrics woven in the piece and imported in the gum, fabrics dyed in the piece, and fabrics dyed in the thread or yarn.

The silk trade is classified for business purposes, as below. We particularly desire to call attention to this, as a guide for the classification of statistics in the twelfth census. We think it is the best division of the silk trade that we have yet seen.

A.—Raw silk, importers, dealers and brokers.
B.—Silk throwsters, manufacturers of and dealers in silk yarns.
C.—Sewing silks and twist.
1. Pound goods.
2. Small goods.
D.—Broad silks.
E.—Ribbons and hat bands.
F.—Knit goods and laces.
G.—Fringes, braids and trimmings.
H.—Skein dyers and dyestuffs.
I.—Piece dyers, printers and finishers.
J.—Manufacturers of silk machinery and supplies.
K.—Manufacturers' agents and commission houses.

Secretary Allen continues his report to the effect that it is well to bear in mind that, with the largely increased facilities for broad silk weaving in the United States, the possibility of overstocking the market beyond the needs of consumers is a factor of which our wiser manufacturers are taking account. We have now in this country over 27,000 power looms for broad silk weaving, and 6,000 power looms for ribbon weaving; and we may say confidently, looking to the great increase of late years in the loom equipment of our silk mills in the United States, that the American silk manufacturers are fully able to meet all the immediate demands upon them in the requirement of the quality of goods and the speed in filling of orders. During the past year there have been a number of additional plants established in this country by foreign firms; and naturally, there has been some extension of facilities by our older manufacturers. The number of new mills and firms added to the industry in 1898 aggregate 49. In Pennsylvania alone mills for broad silk weaving have been established in the past two years in 16 towns and villages, and plants for throwing and ribbon weaving in 13 additional towns—29 towns invaded by the silk industry in one State in two years! While additional facilities of manufacture is a gratifying omen, it also emphasizes the possibility—indeed the probability—of over-production.

Silk weaving in the United States is illustrated by the following statistics, relating to the value of production, showing it to have been in 1873, $2,800,000 for broad goods, and $2,700,000 for ribbons; in 1880, $11,000,000 for broad goods, and $6,000,000 for ribbons; in 1890, $25,000,000 broad goods, and $17,000,000 ribbons; and in 1898, $40,000,000 broad goods, and $20,000,000 ribbons. It is safe to say that the American mills now supply two-thirds of the home market. It is also safe to say that the American mills now consume at least 25 per cent. annually of the entire world's surplus production of raw silk.

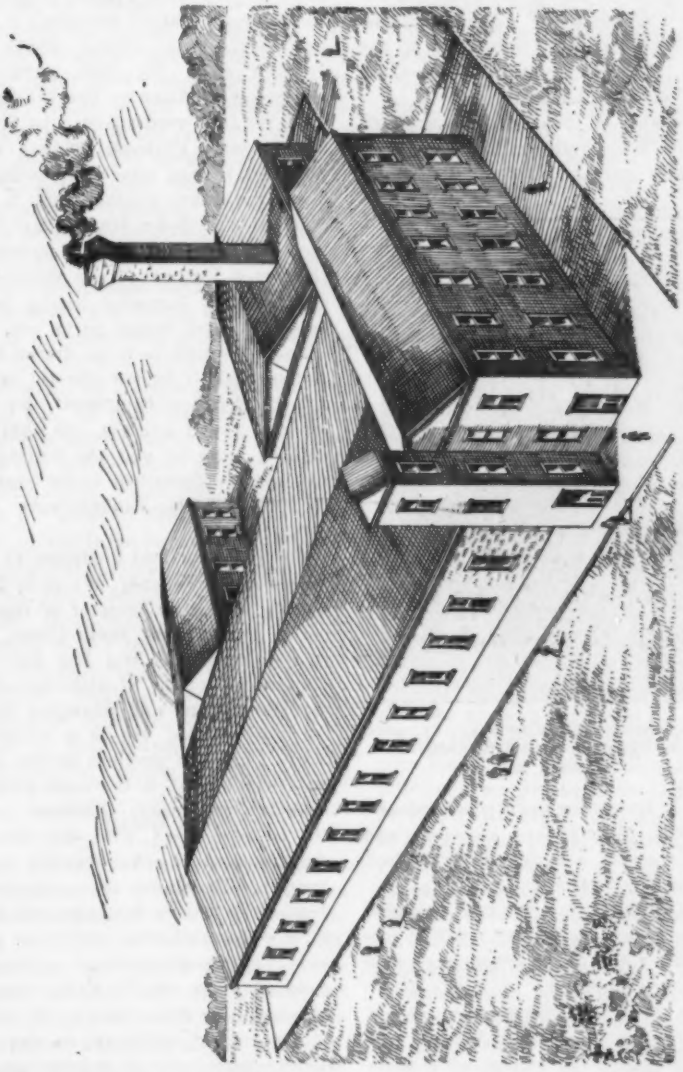
American Woolen Mill for China.

Equipment of the First Flannel and Blanket Factory Furnished by Manufacturers in the United States.

In the remarkable development of the export trade of the United States during the past three years, there have been many interesting illustrations of the progressiveness of American manufacturers and their successful entrance into markets commonly believed to be beyond their reach. Among these incidents may be classed the heavy shipments of iron and steel products to England during the past year, the recent purchase of forty American locomotives by the Midland Railway of England, the shipment of great quantities of improved machinery to Germany, etc. One of the latest and most interesting examples of American enterprise in this direction is the sale of a complete equipment for a native woolen mill plant in Tientsin, China, every piece of which was made in the United States. This order has been filled, paid for and shipped, and the machinery is now near its destination.

The manner in which this contract came to the United States is of no little interest. Dr. R. E. Difenderfer, a resident of Philadelphia, who visits China each year for the purpose of

advancing American interests, was in China a year ago when the construction of a woolen mill in Tientsin was decided upon, and through his influence with the Chinese officials and those most interested in the enterprise, he secured the contract to furnish the complete equipment for the mill. Owing to the fact that this is the first modern woolen mill in China, and situated in a great wool market, with possibilities of large future development in the manufacture of wool, this contract was regarded by foreign machinery manufacturers as of unusual importance and significance. There was, therefore, the strongest rivalry for this contract, and the fact that it was secured by an American means much more than the mere money value of the order.



WOOLEN MILL, TIENTSIN, CHINA

With this and several other important contracts in hand, Dr. Difenderfer returned to the United States last

fall. He made known to the National Association of Manufacturers his desire to contract for the outfit of the woolen mill, and after consultation with various manufacturers of textile machinery, the order for the entire equipment of the mill, with the exception of the power plant and transmission machinery, was given to the M. A. Furbush & Son Machine Company, of Philadelphia.

The size of the mill is, approximately: Main building, 186 by 64 feet, partially one and partially two-story,

His Excellency, Wu Mow Ting, Promoter and Organizer of the First Chinese Woolen Mill.

with a three-story tower; picker-house attached, 48 by 38 feet, one story, and a boiler-house, separate, 46 by 60 feet, one story, all brick.

The equipment of the mill embraces the following machinery built or furnished by the M. A. Furbush & Son Machine Company:

One 30-inch Furbush wool picker, with Bramwell automatic feeder; 1 30-inch Sargent burr picker, with Bramwell automatic feeder; 1 Schofield willow; 1 Hunter washer; 2 sets of Furbush wool cards, 60 inches wide, three cards to a set, with Bramwell automatic feeders and Barker rubbing motions, clothed with hardened and tempered steel wire; card clothing set in flexifort cloth from the American Card Clothing Company; 1 60-inch Furbush traverse grinder; 1 60-inch Hardy grinder; 1 Furbush fillet winder complete; 1 60-inch Furbush turning rest; 1 30-inch Proctor single cylinder breast garnet machine; 2 Furbush self-acting woolen mules, 450 spindles each, 2¼ inch gauge; 12 Crompton & Knowles blanket looms, each 108 inch reed space, 3 by 1 box, 8 harness; 1 Furbush 108-inch warp reel and reeling apparatus complete; 2 Hunter rotary fulling mills; 2 Furbush up and down teasel gigs; 1 40-inch Schaum & Uhlinger hydro extractor; 2 Furbush warp spoolers; 1 Crompton & Knowles baling press; supplies, extra repair parts, etc.

Each machine is to be driven from a countershaft by an electric motor. All the electrical equipment, the boilers and steam engines, the shafting, pulleys, hangers, and the belting for the mill are furnished under separate contracts with Pennsylvania concerns.

The projector and organizer of this mill is His Excellency, Wu Mow Ting, who is Managing Director of the Imperial Railways of North China, and is also known as Wu Jim Pah and Compradore of the Tientsin branch of the Hong Kong and Shanghai Banking Corporation. He is a native of North China, of medium height, keen and bright eyed, a thorough and extremely prosperous business man. He is acquainted with the Chinese classics and speaks English quite fluently. He shows to a remarkable degree the native instincts and foresight of the Chinese and their aptitude for absorbing ideas. He is a man of large wealth and influence. In religion he subscribes to the edicts of Confucius, although tolerant of other creeds. He is a broad-gauged gentleman who keeps his word, and during his fifty years of life has been honest with himself and others.

Tientsin, where the woolen manufacturing industry of China is to have its beginning, is one of the great dis-

tributing centers of North China. Its population is estimated at about 950,000. The city lies at the junction of the Yun Ho and Pei-ho rivers, about eighty miles south of Peking. Seagoing junks ascend the Pei-ho river as far as Tientsin, and between that city and the capital an enormous traffic has been carried on for centuries, by canal and wheelbarrows until lately, much of the business now being handled by the recently constructed railway. The opening of the Shan Hai Kwan coal fields, only sixty miles from Tientsin, has stimulated the development of manufacturing in this city during the past few years, and a great many industries of varied character have sprung up.

As a commercial center, Tientsin is of vast importance, and its trade is increasing at a tremendous rate. This can well be imagined from the fact that the city is the only outlet by sea for the entire trade of a section of North China which has a population not far short of 100,000,000. Wool is one of the large items of export, and among the others are bristles, goat skins, straw braid and coal.

Dr. Difenderfer returns to China shortly in the interest of some other enterprises to be projected and as the Oriental representative of several American concerns, the M. A. Furbush & Son Machine Company, of Philadelphia, among the number.

Rabbit Fur.

At the request of one who is contemplating the establishment in the United States of a factory for cleaning and clipping rabbit furs for hatters' use, the United States government, through its Department of State, requested of its consular representatives abroad to obtain all the information possible concerning the processes through which rabbit furs pass from their being taken off the animals until they are ready for the hatter. The responses from the consuls have been very full, and especially interesting to hat manufacturers.

We give the following abstract of the most salient features of the reports, because of the recent numerous inquiries we have received from different sources regarding this fur for hat manufactures. Some of our inquiries and replies have appeared in our department of Questions and Answers:

The U. S. Consul at Brussels, Belgium, writes that rabbit and hare skins, other than domestic, used for hatters' fur, are imported into Belgium from Australia, England, France, Germany and Russia. As a rule, the skins are dried naturally in an open space. When this is impracticable, however, they are artificially dried by heat. The skins are invariably delivered at the warehouses perfectly dry, and not soaked or washed upon their receipt at the factory unless they are found to be unclean, when they are washed in clear water, free from any ingredients. The coarse hairs are extracted by hand, and are used for bedding and upholstery. In order to get the fur into good felting condition, the skins are brushed (carroted) with a solution of quicksilver and nitric acid of 104 deg. F., and then dried in ovens at a temperature of 212 deg. F. The fur is clipped off by machine. The machines for this purpose are well known in the United States, numbers being exported to Europe from New York. The skins pass between two rollers on a bed knife, to a cylinder fitted with four knives or steel blades placed slantwise. The cylinders revolve at a high rate of speed, separating the fur from the skin, and cutting the latter into thin, threadlike strips, called "vermicelli," which is sold for glue stock. The fur is then sorted. When destined for hat making, it is blown by special machinery (name and description of same refused) to remove the kemps and refuse. This operation is performed either at the fur-cutting factory or by the hat manufacturer himself, if his factory is supplied with the necessary special machinery. The fur is packed for market in paper bags holding five

pounds each. Prepared rabbit fur varies in price, according to the quality and reputation of brand, from $0.386 to $3.281 per 2.20 pounds.

The U. S. Consul at Frankford, Germany, writes that hares are found less abundantly in France and in the Netherlands than in Germany, because of the less protection given to the animal in the former countries than in the latter. Several millions of hares are killed annually in Germany, and are not only eaten in vast quantities by all classes of people, but are exported to Paris, London, and to Switzerland. The source of Germany's output of hatters' fur is, therefore, first, the skins of wild hares, secondly, wild rabbit skins produced in that country, as well as in Great Britain and Australia, and lastly, domestic rabbit skins imported mainly from France and the Netherlands. Hares' fur is softer and finer than that of the rabbit, and is somewhat more valuable for hatters' purposes.

In France, the principal operations in the cutting of fur are: First, the fendage or slitting, which consists of separating the skins from the paws and ears and cutting through the back from head to tail; second, the "ejarrage" or "plucking," which eliminates the coarse hairs (jarre), either with a knife or by machine; third, the "secretage"—that is to say, stretching the skin, hair side out, and by means of a brush, moistening with a solution or mercury and nitric acid, with a little water added. The skin is immediately dried in a cylinder heated from 140 deg. to 176 deg., and the hairs become of a yellow color. This operation is to prepare the hairs for "felting." Fourth. The "brossage" consists in brushing the skins, either by hand or by machine, to eradicate any foreign or sticky substance and to polish the hairs. Fifth. The "coupage"—that is to say, placing the skins one after the other in a machine which separates the hair from the skin. The hairs of each skin are then sorted and made up into packages of about 3 1-3 pounds. The hair thus prepared is sold for from 58 cents to $1.54 per 2.20 pounds. The paws and ears are used for food for chickens and animals, or as fertilizer without further treatment. The "jarre" or "rabbit down" is cleaned and used by bed furnishers. The rabbit skin itself is considered as waste, but, cut in long strips called vermicelli, is used in the manufacture of skin glue, and brings from $7.72 to $9.65 per 220 pounds.

The process of cleaning and clipping in the southern part of France, as reported by the U. S. Consul at Marseilles, is as follows: The outer hair is usually removed by hand, sharp knives being used for the purpose. Women are almost exclusively employed here for this operation. This is the most delicate, difficult and important part of the process; and it is claimed that inherited and peculiar skill is required. Many of these women represent several generations at the same work; their mothers and grandmothers before them were fur cutters. After the removal of the coarse hair, the skins are immersed in a solution of azotate of mercury, fresh mercury, and azotic acid of 40 deg. This solution varies in strength from 5 to 16 per cent., according to the tenacity of the fur and the character of the skins. They are then subjected to a hot-air bath of 122 deg. to 212 deg., according to circumstances; 212 deg. being preferable in order to completely dry and disinfect the skins. They are then put through a machine for the complete removal of the fur.

The method of the preparation of the fur of both the hare and the rabbit, in Germany, is as follows: In general, rabbit and hare skins are not washed, and are never soaked, in the preparatory stage of manufacture. They have usually been carefully prepared and dried for market; but, when skins are fresh and unusually bloody or soiled, they are washed with a weak solution of soap and soda. They are then dried by natural warmth in the open air during the pleasant weather in summer or autumn, and by

artificial heat during wet weather in winter. The coarse hairs are extracted partly by hand work, partly by machinery, the machine work being cheapest, but the hand work best. The machine used for this process is made in the United States, and was invented by C. & E. Chapal Freres, of Paris, who also have a factory for hatters' fur in New York, where the same machine is used. It was patented in Germany, June 23, 1894, under patent No. 75,800, and is also patented in the United States. After the skins have been cleaned and the coarse hairs eliminated, they are rubbed on the fur side with an aqueous solution of nitric acid and mercury. This operation is called carroting, or in France, "secretage," and is now performed in the United States by a machine said to operate satisfactorily, but which has not yet, as far as can be learned, been introduced into Germany, where hand labor is abundant and cheap. The skins are then passed through a cutting machine, which cuts the fur evenly and smoothly from the skin. The machine is of English origin, but is made and used in America. The fur, having been thus cut by machinery from the skin, is assorted by hand, usually into three different grades or qualities, viz., that from the backs of the skins being longest and most valuable; that from the sides next in value, and that from the legs and bellies lowest in grade. The fur is now ready for the hatter, and is packed into paper bags, which contain about five pounds each. If it is designed for export or transportation to any distance, the paper bags are packed into wooden cases of a size to contain from 250 to 300 pounds.

The two great markets for rabbit skins are London and Paris. The quotations in the English market vary from 12 cents to 54 cents per dozen skins, according to quality. An average quality of French skins, known as "clapiers," is now selling at from $4.82 to $6.25 per 104 skins, the usual quantity quoted. Belgian skins are quoted at Paris at $4.06 to $4.25 per 100 skins. Hares' skins come mostly from Saxony, and sell at $9.65 to $10.61 per 100 skins. All these prices, it may be said, are much higher than formerly—about 20 per cent. higher than a year ago.

In Belgium most purchases by manufacturers are made under contracts covering 25,000 to 30,000 skins. The skins are delivered to the factory in packages of fifty or sixty each, and are not usually washed upon their arrival at the factory. The object of washing, when it takes place, is not to thoroughly clean the skins, but to remove any grease or blood which might adhere to them; otherwise, it would be a useless operation, as the subsequent process of carroting, which the skins undergo, suffices to clean them. Washing, therefore, takes place only in the case of the more valuable skins, which justify this trouble. For washing, water alone is used, without any previous preparation whatsoever. If washed, the skins are dried in the open air, whenever the weather permits; otherwise, indoors. The coarse hairs are then extracted. Fur manufacturers generally extract these hairs by hand, although a machine for this purpose was finally perfected about two years ago. Machinery is gradually replacing the hand labor in all the processes of the preparation of hatters' furs, but, on account of its expense, there are comparatively few establishments which have introduced it. Thus there are machines for extracting the coarse hairs, for clipping off the fur, and for blowing it. In a few factories all have been introduced; in others there are machines for one or more of these processes, and in still others not any machinery at all is used. After the removal of the coarse hairs, the skins undergo the process of carroting, which consists in brushing them with a solution of nitrate of mercury, $Hg(NO_3)_2$, and subsequently exposing them to a strong heat. When subject to a moderate heat, the carrotage is called white; when the heat is intense, it is yellow carroting. After carrot-

ing, the fur is clipped off for the most part by machinery. The fur as it leaves this machine is deposited upon a board or metallic plate, without having lost the original form of the skin, this latter dropping down, cut in pelts, under the machine.

A Belgian workman draws the plate containing the fur to one side, and, separating the fur according to the various parts of the body of the animal, assorts it into different qualities. The fur may now be said to be ready for market, as it is the general custom of hatters to buy it at this stage of preparation. Fur, therefore, which is intended for sale, is packed in bundles varying in size according to the demand of the country to which it is exported. The French trade demands packages of about 2 1-5 pounds. The English and American hatters prefer it in bags of five pounds. Most hatters, especially those in the United States, prefer to purchase fur thus clipped and complete the process of manufacture themselves. The operation remaining to be performed is known as blowing (soufflage). In this operation alone, it may be said, exists special skill. The "blowing" consists in mixing different qualities or colors of fur together in certain proportions, according to the article to be manufactured. There are various special machines, at least ten in number, employed for this purpose. The mixer, the pin machine, and the blower, properly so-called, are some of them. The "blower" is a ventilator, in which, after mixing by hand or by machine, the fur is placed. Through this apparatus —sometimes 200 feet long—the fur is blown by a strong draft. The fine hair comes out of the far end thoroughly mixed, while the coarse hair falls to the bottom of the machine. The fur after this blowing process is entirely ready for the manufacture of hats. Very little such fur, however, is sold to American hatters, who, as previously stated, generally have their own apparatus for this last-described operation.

Mercerizing Machinery.

Seldom has any new textile process excited the interest and led to so many experimental attempts at manufacture as the mercerizing process for yarns and piece goods. The Textile World has published much information about the process and has from time to time mentioned the machinery used in connection with it. As the process originated abroad, of course the first apparatus employed was of foreign design. Much experimenting has been done, and several distinct lines have been followed in the apparatus developed. When American manufacturers took it up, many of the pioneers designed their own apparatus, combining American ideas with foreign experience.

A few of the machine builders, realizing the growing importance of this process, have not been asleep in this direction, and there has recently been brought to our attention a machine designed and manufactured by the Granger Foundry & Machine Co. of Providence, R. I., which, we understand, has proved itself most successful in commercial operation. Like all new methods and processes, while the principle may be perfectly clear and easily understood, satisfactory results are usually obtained only by correct manipulation and proper development of mechanical details. So it has been with mercerization in a very marked degree, and although some few establishments on this side of the water are turning out a very superior product, there have been more instances of failure or only partial success, which have been largely due to improper methods and makeshifts. From all we can learn, the Granger machine has proved most efficient and should put American manufacturers on the same plane with European competitors. It embodies some of the best foreign patents with their own ideas. This apparatus is in a general line with which the Granger Co. has had experience for years, and the

trade naturally looks to such builders for the development of this class of machinery to the same high point that characterizes their other products, and we believe will not be disappointed.

Textile Industries in Japan.

The United States Consul at Hiogo, Japan, has recently forwarded to the State Department a very interesting report concerning the textile industries in Japan. Much of the information that he sends seems to be obtained largely from a recent report to the British foreign office on the textile industry of Japan, which is regarded as more representative of the present conditions than the report made by Robert P. Porter to the United States government a few years ago. The estimates of the cost of labor given by Mr. Porter are far below the present standard of wages. The cost of labor in many trades has more than doubled since his report was written, and this position has greatly enhanced the cost of production.

The manufacture of textile goods in Japan is not confined to certain localities, but extends by means of hand looms all over the country. The spinning wheel was formerly in general use, but during the last twenty years it has been almost wholly displaced by spinning mills using machinery. More than 1,000,000 spindles are now thus operated, forty-seven mills in Japan producing last year an estimated yield of 650,000 bales of yarn of 400 pounds each. Present returns show that more than 200,000 bales will be shipped to China during the current year, and the home demand for counts averaging 18s. will be nearly supplied by the remaining 450,000 bales. Only one of the spinning mills in Japan has imported the machinery necessary for spinning the higher counts above 30s. The Nippon mill, of Osaka, has done this, but so far, has probably not made a success of it. Higher counts are steadily imported from England and in greatly increasing quantities, to meet the home demand. When mill hands with greater skill are to be procured in Japan, the spinning of the higher counts will increase more rapidly, in order to supply the domestic market and the demands from China and Korea.

Increasing demand for the higher counts of cotton yarn explains the rapidly growing market for American cotton, from which it is produced. It would be well for American cotton producers to note this fact, with a view to educating a sufficient number of Japanese workmen to become expert and teach others, in order to extend the sale of American cotton, from which the higher counts are made.

Many of the large class of persons formerly employed in spinning by hand are now engaged in weaving textiles on hand looms. It has recently been computed that more than 600,000 hand looms are in use in Japan, and it is stated that they employ 890,000 women and 50,000 men. As these hand looms are generally operated in private houses, giving a home character to the work, it can readily be seen why such slow progress is being made in the introduction of power-weaving machinery. The hand looms now in use are called "battan," and are an improvement on those formerly used. They cost but about $2.50 gold each, and take up little room in a house, while a power machine would require a separate building, and with the necessary power would cost, say, nearly $250 gold. The hand loom will produce about half as much as a power loom, but one person could attend to perhaps four or five of the latter at a time, and thus be able to turn out, say, eight or ten times the product with a power loom as with a hand loom. The convenience, however, of having the hand loom in the house and the difference in its cost will, perhaps, be sufficient to delay the introduction of power looms to any great extent for some time to come. The comparative cost of labor is about 1

to 8 or 10 in favor of the power looms, and this should tend to crowd out the hand looms very fast; but it is not doing so yet, though the progressive spirit of the Japanese will no doubt ultimately cause them to substitute power looms for the hand looms now in use. In regard to spinning machinery, the labor cost is about 1 to 150 in favor of the machine, and this very great difference is, of course, the cause of the rapid introduction of spinning machinery.

The hand looms are hand-made, and are principally used in supplying some 1,000,000 pieces of goods, say, 14 inches in width and from 12 to 25 yards in length, to the home market and for export to China and Korea.

The Japanese manufacturers are very conservative in their business methods, and manufacture large quantities of goods only on orders. The largest silk factory in Japan using power looms is the Kyoto Orimono Kaisha, of Kyoto. It imported these machines from France. It was the intention of the company to manufacture silk fabrics for export; but after some years of unsuccessful attempt, the project was abandoned, and the company commenced making satins and "obi" materials for home use. In these lines, it is said, it has been very successful. This mill also manufactures curtain and upholstery materials, and it has found a good market for them in England and Australia. The power looms first obtained have been copied here, and the company is using large numbers of them; but they are not equal to the imported ones.

Silk in its various forms, from the raw material to the finished product, is mainly exported from Yokohama. The industry dates back to an early period, and is today in an advanced condition.

There is no doubt a great misapprehension exists in our country, as to the necessity for the use of woolen goods in Japan. The climate is thought by many to be such as not to require warm clothing in winter, but this is not the case. During the last winter, which was said to be not as cold as usual at this port, foreigners were clothed as warmly as persons need to be during the cold season in Washington, D. C., and the masses of the Japanese people needed, but did not have, the same protection; and it must be remembered that this locality is a warm one, in comparison with some other parts of the Empire.

The manufacture of woolen goods is a new industry here, and a small one, as only about 13 per cent. of the woolen textiles used in Japan are made in this country. The raw material is all imported from China, Australia, and London. The four woolen factories of the country are located in Osaka and Tokyo. One is owned and operated by the Imperial Government and manufactures supplies for the army and navy. Some of the better grades of cotton and woolen yarns are made there, but they are mostly imported. A large proportion of the woolen cloths used are made on hand looms.

A much more general use of woolen products is requisite for the comfort of the people, and all classes are constantly becoming more able to purchase them; hence there is no doubt that the demand for them will increase.

Japanese rugs have deteriorated in quality to such an extent as to greatly check the American demand. The materials used are hemp, jute, cotton, wool, and silk, the two latter separately and in combination. They are made on upright hand looms, which vary from 3 to 24 feet in width. The pattern is worked from the front. This is also largely a "home industry." There are no large factories. Only one or two employ more than 100 hands each. Kobe is the center of the rug-making district.

Nearly all the spinning machinery still comes from England. American manufacturers of machinery have obtained large orders for other kinds; but they seem to have utterly ignored the constant demand for spinning ma-

chinery and for all the other spinning-mill requirements, including engines and boilers. This may also be said in regard to almost all the weaving machinery in the country. The first spinning machines used in Japan were sent from England, where a single firm has supplied more than half the spindles. Another English firm supplies a complete mill equipment, including boilers and engines. Weaving machinery is largely furnished by a third. French and German makers have supplied a considerable quantity of the silk and woolen weaving machinery, and some woolen machinery for an Osaka mill came from the United States; but our country is practically sending almost none of the large quantity of spinning and similar machinery constantly in demand.

There are 52 spinning and 16 weaving establishments here, using imported machinery. The weaving establishments with machinery are located as follows: Five at Tokyo, four each at Osaka and Kyoto, and one at Nishinomiya, Sidzuoka, and Wakayama. There are four flax (jute) mills making canvas and twine, located in Shimotsuke, Sapporo, Otsu, and Osaka.

Pineapple Fibre.

The Calcutta periodical, "Capital," as reported in the Board of Trade Journal, states that it appears somewhat curious that pineapple fibre was years ago experimented with and condemned by English spinners. In India, also, although no difficulty apparently attends the separation of the fibre, it is turned to very little account. The far-famed weavers of Dacca, when long since an attempt was made to induce them to bring the staple into use, would have none of it. In Burma again, where the plant is so abundant, the fibre seems to be utterly neglected.

On the other hand, there is a considerable amount of information extant which seems to furnish corroborative evidence as to pineapple fibre actually possessing the essential properties required to make it a good substitute for flax. It has even been claimed that in both its wild and cultivated forms the pineapple yields fibres, which, when spun, surpass those obtained from the ideal flax in strength, fineness, and lustre.

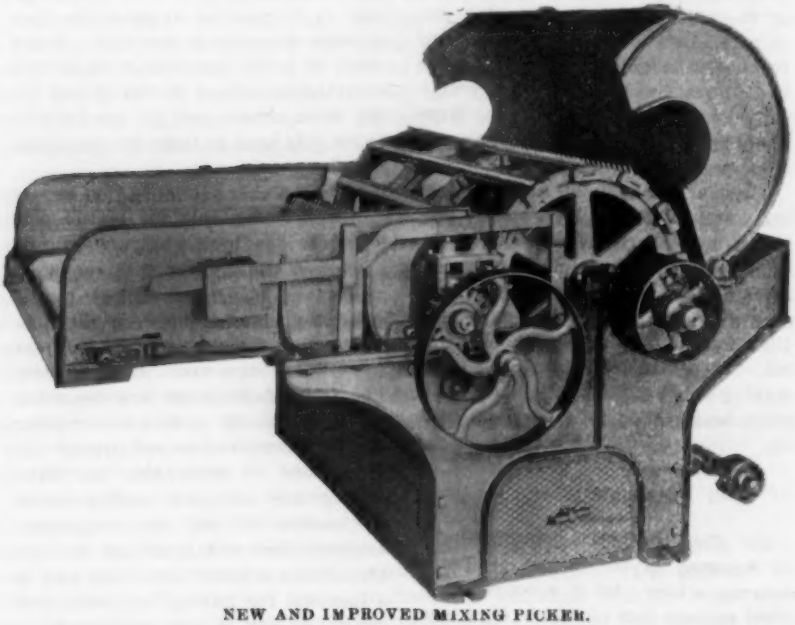
It has been stated that a certain quantity of the fibre prepared at Singapore tested against an equal quantity of flax sustained 350 pounds, while the latter could not bear more than 260 pounds. Another advantage held to be peculiar to pineapple fibre is imperviousness to moisture. Ropes made of it are thus said to withstand constant immersion in water; and for the same reason and its non-liability to rot it is used in India for threading necklaces.

As to the characteristics that render it readily adaptable for textile purposes, it has been observed by one writer on the subject that the mere process of bleaching suffices to destroy the adhesion between the bundles or fibres, and so renders it fit for spinning in the same way as flax. The isolated filaments are described as very fine, of a tolerably regular diameter from end to end, but of different size, of remarkable flexibility, curling and crisping readily under mechanism. It has been confidently asserted that the fibre can be employed as a substitute for silk, and as a material for mixing with wool and cotton, as silk is now so extensively employed. For sewing thread, twist, trimmings, laces, curtains, and the like, its particular qualities seem to render it specially applicable.

From the pineapple of the Philippines a famous cloth is manufactured, much esteemed for its fine hair-like fibres, but this is considered as perhaps belonging to a different species. Reference has also been made to a plantation established years ago at Singapore by a Chinaman, who there prepared pineapple fibre for export to his native country to be used "in the manufacture of linen."

New and Improved Mixing Picker.

Wool manufacturers will undoubtedly view the accompanying illustration of a mixing picker with much interest, as containing many features in the way of valuable improvements. This machine we represent, is built in various sizes, from 24 to 48 inches wide, and can be driven with a tight and loose pulley, or with a pulley on each end of the shaft, for double drive, which is desirable for the larger sizes. A self-oiling loose pulley is placed upon the machine, which will run a long time without attention. The speed of the cylinder is from 800 to 1,000 revolutions per minute, the capacity of the machine varying from 1,200 to 2,400 pounds per hour, according to its size.



NEW AND IMPROVED MIXING PICKER.

In calling attention to some of the features of this machine, we will refer to its construction, as being entirely of iron and steel, except the feed apron, which is made of hard wood slats. As will be observed, the hinge cover swings backward, giving easy access for cleaning, between the lots. The cylinder is accurately balanced to run at the high rate of speed, as noted above. As will be seen in the illustration, flat steel teeth are used, dovetailed into a steel bar, which does away with the set screws that are usually used to fasten the teeth, which are frequently a source of trouble in collecting stock. These steel teeth can be readily renewed, at a small expense. The grate slides out on ways, and is easily removed, if necessary, to clean it. Doors are placed on each side of the machine, so that the refuse can be readily taken out, without removing or disturbing the grate. A double set of cock-spur feed rolls are used, which intersect, and are self-cleaning. By the use of the double feed rolls, it is claimed that the stock is more thoroughly opened, straightened and mixed, and that it is impossible for lumps, or bunches, to pass through, or be drawn into the main cylinder. A differential speed is given to the feed rolls, the second pair running one-third faster

than the first, the functions of which are readily seen as insuring a more thorough opening and mixing. The feed rolls are so geared that they are never out of mesh.

This machine is manufactured by the Atlas Manufacturing Company, Newark, N. J., which also build a special picker for the use of hair dealers and mattress manufacturers. This latter machine will handle all kinds of stock used by such parties, as palm-leaf fibre, cotton, tow, etc. This company are also well known as the builders of Parkhurst bur pickers, beside building special feeds for all kinds of pickers, feed rolls, etc.

Bleaching Carpet Yarn with Peroxide of Sodium.

The bleaching of carpet yarn by the sulphur process was unsatisfactory for several reasons; first, the desired shade was not obtained, and secondly, the fibre was affected to such an extent that the goods have been worthless sometimes. The peroxide of sodium process has overcome all those troubles, and surpasses even the greatest hope; it puts the fibre in a condition which makes it look like wool. As a good result depends much upon the preliminary treatment, great care should be taken in that, and the scouring should be as careful and thorough as possible, as it also marks a step in the dyehouse economy.

Soaps which are mostly used in scouring processes, says the Textile Manufacturer, would require too much time and too many baths to remove the dirt and grease; therefore, stronger solvents are applied. Caustic soda, largely used in mills, is doing good service, and if it is applied in a proper strength, the fibre is not affected at all. For 100 lbs. of yarn 6 lbs. of caustic soda in a suitable quantity of water will do the work, but sometimes a second bath may be necessary, which always should be employed if the coloring matter has not been extracted enough, otherwise this extraction would be left to the action of the peroxide, and so far increase the cost of bleaching. In the following the entire process is described.

In 400 gals. of water, which amount will be enough for 100 lbs. of yarn, 6 lbs. of caustic soda are dissolved, the material put in, and heat applied to boil for about two hours. The yarn is generally clean enough now to enter the bleaching bath after being thoroughly rinsed in lukewarm water. If the yarn is not clean enough, continue boiling for one or two hours, and then transfer to the bleaching bath, which contains for the above figures 8 lbs. peroxide soda and 10 2/3 lbs. strong sulphuric acid. The acid is mixed with the water first, and then the peroxide slowly sifted in. If red litmus paper turns slightly blue, goods can be entered and heat applied. The temperature should be kept at 160—180° F. for six to seven hours, after which time the bleaching is finished. The yarn is lifted and immersed into an acidulated bath containing for each 100 gals. of water 1 lb crystallized oxalic acid. After fifteen to twenty minutes' immersion, a thorough rinsing in lukewarm water should follow. Too much cannot be said regarding its thoroughness, as a neglect in rinsing will cause trouble in subsequent processes.

Pan-American Exposition.

Buffalo has set itself to work to insure the success of its Pan-American Exposition. We believe that never in the history of any subscription has such wonderful response been made. In one week, ending January 28, $1,200,000 have been actually subscribed to the stock of the exposition company, and subscribers are rolling in at an ever-increasing rate. Not only have capitalists subscribed, but business houses, large and small, and employees have raised large sums. It is only a short time since the matter was actively taken up, and it looks now as if the capital stock of $1,000,000, and bonds to the amount of $2,500,000 will be subscribed in Buffalo.

There never was a time when an exposition of this kind has aroused greater interest, and in the able hands which are guiding the movement, there is every assurance that it will prove to be a great success and of the greatest possible value in the extension of our Pan-American trade.

Wait's Crossed Grain Quill.

The merits of Wait's Crossed Grain Quill have been tested by long use in the leading mills of the country, and it still maintains its popularity. For those who are not familiar with it, we may say that the improvement in this quill consists of a splint ring of white oak, thoroughly cemented and inserted in a groove at the end of the bobbin, being nearly at right angles with the grain, so that it gives almost sure protection from internal or external pressure, and those who have used it for years tell us that it does not become loose. The insertion of this ring does not add to the weight or affect the balance of the bobbin, and it can be applied to nearly all types that need such reinforcement and strengthening. This improvement gives great durability to warp and speeder bobbins and saves a very large percentage of the usual breakage. Many mills have been using them exclusively for ten years or more. The Henry Parker Co., of Springfield, Vt., who are manufacturers of all kinds of bobbins and spools, are the sole manufacturers of Wait's Crossed Grain Quill, and would be pleased to correspond with interested parties and send a sample for trial.

The Silk Industry.

Franklin Allen, secretary of the Silk Association of America, in his review of the industry for the year of 1898, says:

"We now have in this country 27,000 power looms for broad silk weaving and 6000 power looms for ribbon weaving, and we may confidently say, looking to the great increase of late years in the loom equipment of our silk mills in the United States, that the American silk manufacturers are fully able to meet all the immediate demands upon them as regards quality of goods, and speed in filling orders. During the year there have been a number of additional plants established in this country by foreign firms, and naturally there has been some extension of facilities by our older manufacturers. While additional facilities of manufacture is a gratifying omen, it also carries with it an apprehension of facilities unduly increased. It is hardly necessary to say that over-production is about as bad as a sluggish market; in fact it conduces to it."

—It is said that glycerine added to the caustic alkali used in mercerization prevents the cotton from shrinking. The goods are treated in a mixture of soda lye of 38 deg. B., with half its volume of glycerine, until it has a parchment-like appearance. It is then washed and dried. This treatment increases the strength of the cotton by 23 per cent. without, however, contracting it, and also increases its affinity for dyestuffs. The glycerine will prevent even 50 deg. B. lye from causing any shrinkage. Instead of adding the glycerine to the mercerizing bath the stuff may be first soaked with the glycerine and then passed through the lye.

—The ring traveler plays a very important part in the spinning of cotton yarns.

—Cross breeding of sheep has been a fruitful subject of discussion since shepherding began.

—The flax fibre, as met with in commerce, does not consist solely and entirely of the fibre proper, but is accompanied by other substances of a woody, waxy, etc., nature, the quantity of which varies with the nature and extent of the retting and scutching processes to which the fibre has been subjected.

COTTON DEPARTMENT.

23190*
Apr. 11.98.

American Cotton Spinning Machinery.

ARTICLE IX.

CHARLES CLIFTON HEDRICK.

(Copyrighted.)

Another style, shown in Figures 56 and 57, which is called the scroll adjustment, possesses merits. The bend D is supported at three points by arms A, B and C, instead of five, as in the first one shown, the bend being made proportionately heavier and stiff-

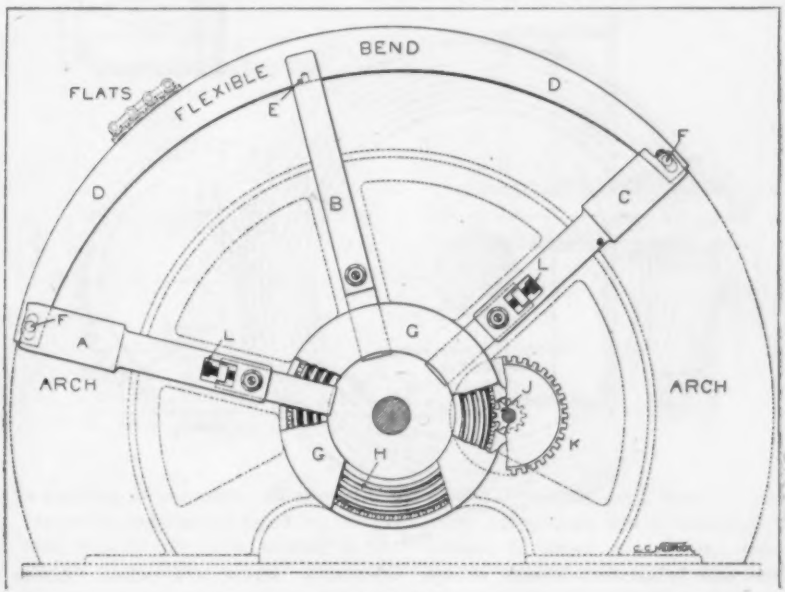


FIG. 56.

er. The arms A and C are connected to the bend by a stud F, which passes through a slot in the bend. The movement endwise is obtained by having the slot in the bend instead of in the arm. The centre arm B is not fastened to the bend, but acts as a support for it. A pin E, in the arm, prevents any movement of the bend circumferentially. These arms are all made in two pieces, partly for convenience in manufacturing, and in order to set them alike, when the card is first erected, adjusting screws L are provided for the two end ones, which, after being properly set, are permanently secured by dowel pins. The lower end of the arms is provided with teeth or threads which work in the threads of a geared scroll H, the pitch of which is one-half inch. The scroll turns in a recess in the arch which is concentric with the cylinder. Around the periphery of this scroll is cut a gear of 110 teeth, which is in gear with a pinion J, of 11 teeth, which is fastened to one end of a stud P, while an index wheel K, having 50 teeth or notches, is fastened to the other end. It will be seen, that, as the pitch of the scroll is one-half inch, two revolutions of it would be necessary to give the arms and bend one inch movement radially, and, as the scroll has 110 teeth, to give it two revolutions, it would require twenty turns of the 11-toothed pinion, which would be

equal to 1000 notches. Thus if 1000 notches are required to change the radius of the bend one inch, a movement of one notch will change the radius 1/1000 of an inch. After the card has been adjusted, a latch N, can be pushed between the notches of the index wheel and locked, preventing the setting from being changed.

An examination of the drawings will show that an adjustment of this kind possesses some advantages over the bend with the five setting points, requiring very much less time to adjust and being very simple in construction and after having been once properly erected, is not liable to get out of order, through careless handling.

While a great deal depends upon the careful setting of the flats, many evils arise, such as the wearing of the bearings, due to the weight of the cylinder, the pull of the belt and various minor causes, which tend to alter the position of the cylinder, thus destroying its concentricity with the bend. When such wear takes place, some means must be provided to restore the cylinder to its concentric position.—

In Figure 58, a section and a side elevation of an adjustable cylinder bearing are shown. The cylinder boxes, or bearings, are supported by pedestals H^2. The lower part of each pedestal rests upon a slightly tapered plate H^3. Upon either side of the pedestals are lugs H^4, which are securely fastened to the card frame. From the plate H^3 projects a screw C^2, which passes through one of the lugs, while from the pedestal H^2 projects a screw C^3, which passes through the other lug.

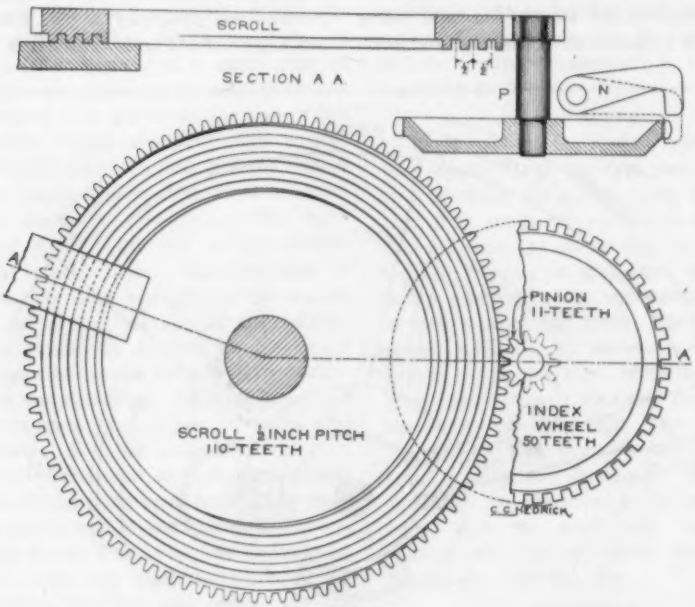


FIG. 57.

When a vertical adjustment of the cylinder is required, the tapered plate is given a horizontal movement, by turning the nuts on the screw C^3, but when a lateral adjustment is desired, both the pedestal and plate are moved together, both parts being fastened to the card frame by cap screws C^4.

Sometimes oil from the cylinder bearings runs down on the cylinder head, particularly if the card has been standing idle for several days. If this occurs, the oil is apt to get upon

the clothing of the cylinder, softening the cement with which the several layers in the foundation are stuck together and causing them to separate and puff up in places, thus destroying the holding power of the wire teeth. To prevent this, the pedestal is made with a lip D^1, projecting from the back side directly under the bearing. Any oil that drops will be caught by this lip and carried to the outer side of the card frame, as indicated by dotted lines.

The saw-tooth clothing, with which the licker-in is covered, is made from thin, flat, steel wire, which is about one-quarter of an inch in width and one sixty-fourth of an inch thick, with

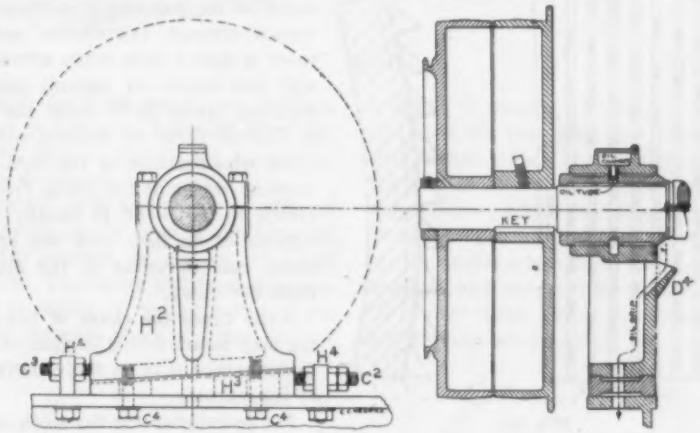


FIG. 58.

a shoulder on one edge. The teeth are formed by cutting out a portion of the thin edge of the wire, making it resemble the teeth of a saw. The wire is inserted in grooves, which are cut, spirally, in the shell of the licker-in, they usually being eight per inch, thus giving eight rows of teeth for each inch in the length of the face and about 112 teeth for each row in its circumference.

Two full sized views of saw-tooth clothing are given in Figure 59, showing a portion of the licker-in shell, with the teeth inserted and a side elevation of the teeth with the shell in section.

Figure 60 shows an enlarged, front view of the teeth, showing the depth to which the wire is let into the shell, the shoulder of the wire coming just below the surface. After the wire is inserted, the edge of the groove, next to the shoulder, is upset, slightly, by passing a hardened steel disc over its surface, which prevents the wire from pulling out. A licker-in, covered with this style of clothing, requires no cleaning, stripping or grinding and is, in every respect, superior to the licker-in, covered with leather clothing, which is used on the old-style stationary flat cards.

The clothing for the cylinder, doffer and flats consists of a foundation, made up of from three to five thicknesses of cotton, wool, linen or some other substances, firmly cemented together, in which are set the wires, which form the teeth, as shown in Figure 61—a side elevation. The wire extends from the back side of the foundation, at an angle, until a point, nearly half way in its length, called the knee, is reached, and then bends forward, the upper end returning to a point about over the lower end, as shown by the vertical line A—B.

Figure 62, which is a front view, shows that the teeth, which are made from a coil of wire, are bent into the form of a staple. The two upward projecting prongs are called points,

and the horizontal part, connecting them, is called the crown.

A matter of great importance, and one which is often overlooked, is the amount of angle or pitch given to the tooth, and the position of the point in relation to the crown.

The teeth are, in one sense, a series of hooks by which the fibres are caught and carried forward. If the forward inclination of the point is not sufficient, the teeth lose some of their holding power, while if the inclination is too great, the holding power is such as to cause serious defects in carding.

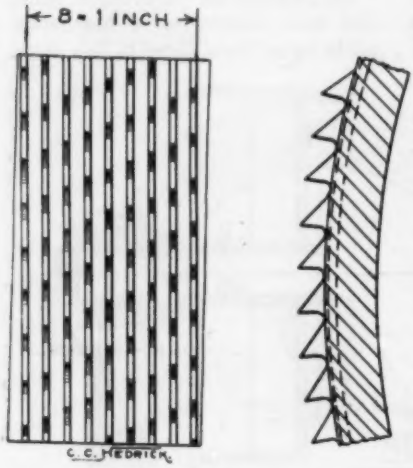


FIG. 59.

To explain this more fully, Figures 63, 64, 65 and 66, which are enlarged views of card teeth, will be considered.

In Figure 63, the crown of the tooth is marked A, the knee B, and the point C. The angle of that part of the tooth between A and B is about 15 degrees from a vertical line, and this is the average of the wire for cotton card clothing. If the angle is increased, as shown in Figure 64, it is evident that the tooth must have a much greater holding power, causing the short fibres, neps and dirt to be forced to a considerable distance beneath the point. They would otherwise be caught by the flats or thrown off, to fall through the screens. The spaces between the teeth, in this way, fill rapidly, which necessitates stripping the card much oftener than would be required with the wire set properly, and also makes the removal of the strippings much more difficult.

Another point in connection with the angle of the wire being too great, is illustrated in Figure 65. If the point of the tooth is pushed back, by a tuft of cotton, there is a liability of its straightening at the knee, which, acting as a fulcrum, causes the point to rise into the position shown by dotted lines.

Quite a common defect in card-clothing is shown in Figure 66. If the point of the tooth stands too far forward of an imaginary vertical line, drawn through the crown, and the tooth is forced back while at work, it will rise above its natural plane to such an extent as to cause the point to become faced by contact with the other wire surfaces of the card. The vertical height of the tooth, from the crown to the point, is usually three-eighths of an inch, and the knee is about three-sevenths of the distance from the crown.

Many times the cause of bad carding may be attributed to some of these faults rather than to the construction of the machine.

The foundation for the teeth should be of material that has the least possible amount of stretch, in order to hold the wire firmly enough to carry around the fibres which become attached, and yet should be flexible enough so that the wires shall spring back to their original position, when they have been deflected by grinding or by the strain put upon them, when the card is in operation. If the foundation is drawn on too tightly, the wires are apt to break at the point where they leave the foundation.

The material composing the several layers of the foundation is varied somewhat to suit the different requirements. For the cylinders and doffers of revolving flat cards, it is generally four-ply, first, a thickness of twilled

cotton cloth for the crown side, then a layer of coarse linen threads, added to give strength, running lengthwise of the clothing, next a thickness of heavy woolen cloth, and last another facing of twilled cotton cloth. Sometimes an additional facing of rubber is used, which answers a double purpose, to give an elastic support to the wire, where it leaves the foundation, which brings the tooth back into position, when it has been deflected from any cause, and to protect the foundation from dampness.

For the flats, a three-ply foundation is almost wholly used which is called double covered, or cotton, wool and cotton. The crown and face sides consist of layers of twilled cotton cloth, while between them is a thickness of closely woven, heavy woolen cloth. The rubber facing is seldom added, as the flats in passing back over the cylinder are often exposed to the sun's rays, which cause the rubber to become hardened and to disintegrate.

A comparison of tests, made of several kinds of foundations, shows that a strip of the four-ply, above referred to, two inches wide, when put under a tension of three hundred pounds, became elongated two per cent. Four-ply foundation, cotton wool and cotton with rubber face, became elongated six and one-half per cent, and leather foundation elongated fourteen and one-half per cent.

The clothing for the cylinder and doffers is made in continuous strips, and is called fillet. That used for the cylinder is usually two inches wide, and that for the doffer one and one-half inches wide. It is drawn on to the surface by a device called a clothing machine, which registers the tension put upon it; the cylinder being clothed under a tension of about three hundred and seventy-five pounds and the doffer under about two hundred and seventy-five pounds.

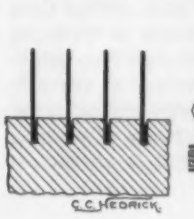


FIG. 60.

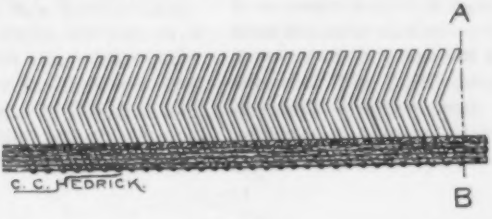


FIG. 61.

FIG. 62.

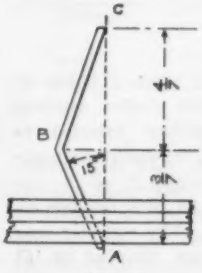


FIG. 63.

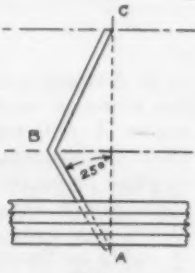


FIG. 64.

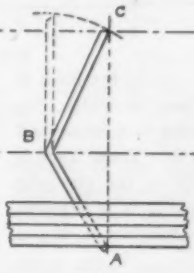


FIG. 65.

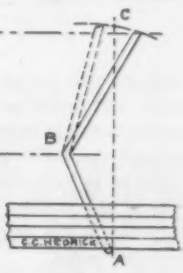


FIG. 66.

Figure 67 shows a front and a rear elevation of a doffer, and, on account of the fillet being wound spirally around it, the teeth must strike the fibres at a slight angle. It is desirous that this angle be as small as possible, so that the danger of the teeth breaking, or being turned out of their correct position, will be reduced to a minimum, and, as the doffer is about

one-half the diameter of the cylinder, the clothing is made narrower, so that the angle of the spiral shall be nearly the same as that of the cylinder. In putting on the fillet, it is usually cut so as to form what is called an inside taper, thus leaving a straight edge extending the whole distance around, on the outside of each end of the doffer. It will be seen that the clothing, which starts at A, is three-quarters of an inch wide, and this width extends half around the doffer to B, where it commences to widen, until it passes around the whole distance of the doffer to a point C, beside the starting point A, where it is the full width, one

FIG. 67

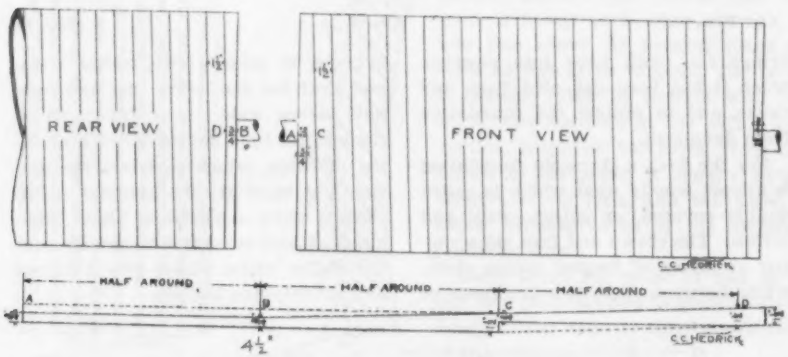


FIG. 68.

and one-half inches. At C, the fillet is again cut down to half its width, the portion cut out tapering to a point half around the doffer at D. From here it extends in full width to the opposite end of the doffer, where it is tapered to finish in the same manner as at the starting point.

In Figure 68 is shown a strip of fillet with the portion cut away for an inside taper. The letters of reference used are the same as in the preceding illustration.

The fillet for the cylinder is also put on with an inside taper and in the same manner, but, as the cylinder is more than twice the diameter of the doffer, a strip of considerable length has to be cut away before the full width of the fillet is reached.

Principles and Practice in Cotton Spinning.

W. S. TAGGART.

I have been taking some little interest recently in watching the performance of a carding engine having two doffers.

Most of us have probably often heard of these peculiar freaks of machine makers, and some of us have even had the experience of watching these freaks pass through their initial and experimental stages in the machine shops. To come across them, however, in the full bloom of working order in the cotton mill, is a treat not to be despised, and when I knew of the aforesaid double doffer carding engine, I felt sufficient interest to make a pilgrimage to see it and understand its peculiarities.

The sketch, Fig. 20, will convey an idea of what I saw. The cylinder was 50 inches in diameter, running at 163 revolutions per minute. The top doffer, A, was 12 inches in diameter, running at 27 revolutions per minute. The bottom doffer, B, was 18 inches in diameter, running at 17 revolutions per minute. Two webs were coming from the doffer, and being combined at the calender rollers, C, passed forward to the coiler can as one sliver.

We all know what an ordinary web is as it comes from the doffer. It is thin enough in all conscience, but try

to imagine a web split up into two and realize how thick, or, rather, how thin it must be. Indeed, to help you, I may say that my instructions were to walk past the card on tip-toe, and as slowly as I could, in order not to disturb the air, else I should break the webs. Of course, nobody, who knows anything about cotton mills, would take such instructions literally; cotton mills wouldn't or couldn't exist under a sick room regime; so I simply walked up in a respectable manner and stooped to get a close look at the webs coming from the

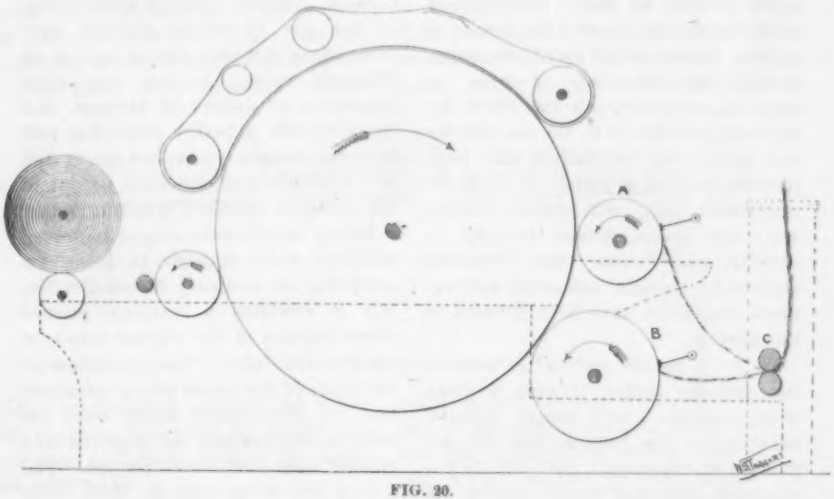


FIG. 20.

doffers; but what was the matter with them? They were dancing about and playing hide-and-seek around the combs and the calender rollers. In another few seconds no calender rollers could be seen, nothing but a struggling mass of fluffy cotton. A frantic rush to move the strap on the loose pulley, and a muttered exclamation of "I told you so!" roused me to a sense of my share in the fatality, and I lapsed into the usual condition of one who feels he has done a wrong.

Matters were soon put right and so, following out my previous instructions literally, I had the opportunity of carefully watching the phenomenon

at work. There were certainly two doffers and two webs, though one felt more inclined to call the latter films rather than webs, anyway there they were and the fact of their existence was of itself inducive to thought and enquiry.

Just think for a moment. A cylinder carries the cotton around past the flats. During this journey, the fibres have received a good carding and the great majority of them are, as it were, hanging on to the points of the cylinder wire. The teeth of the doffer receive these fibres and take them around to the comb. If these fibres were mathematically inclined and the doffer could be made to run at the exact rate of speed, etc., etc., etc., every fibre would no doubt be taken off the cylinder, but as it happens to be cotton fibres we are dealing with, and as these have their own ideas of the subject, some of the cotton on the cylinder slips past the doffer and starts out on another revolution. Now, it has struck some ingenious mortal that the fibres that have missed the doffer are wasted and so, by placing another doffer in their path, he traps them and prevents their second trip around, thus adding them to

the production and giving them a useful purpose in life.

To continue our thinking. Suppose the feed roller passes through a certain amount of cotton per minute; no doubt a very small amount of this misses the doffer and is carried around, but this amount is the same every revolution, it never gets more or less, so that the few fibres of cotton, on the under side of the cylinder between the doffer and licker-in, represents all that is lost between any two strippings of the cylinder. What, then, is the use of the two doffers? They clearly cannot save cotton, for there is none to save. An ordinary doffer in the hands of a good man is always regulated in speed, diameter, setting and character of wire, to take off practically all the fibres the cylinder presents to it, no one can desire more. But two doffers have been introduced, and a glance at their arrangement, etc., will enable anyone who has given serious thought to carding, to realize the immense amount of thought, scheming and expense that must have been devoted to the novelty.

To get a second web, after passing the ordinary doffer, if such a thing were possible, would simply mean a reduction in the original web by the amount of the second web, but its microscopic character would prevent its being seen, so they had to manufacture one, and it has been done in this way. A doffer has been designed of such a diameter that it will deliberately allow to pass enough fibres to enable another doffer, also specially designed for the purpose, to pick them up. No more and no fewer fibres are taken up by the two doffers than a properly designed single one would take up, and fibres still pass the bottom doffer exactly as they pass a single one. One might use three doffers and arrange speeds and diameters for that purpose, giving us three webs, but the last doffer would allow just as many fibres to pass. Nothing can prevent this; it all depends on the last doffer, and just as much care can be given to a single doffer as to the last doffer of a pair in order to allow the minimum of fibres to pass. Those who like might try the arrangement; one can learn a lot from experience, but it's a dear school, oftentimes.

Just now, another hobby (see Fig. 21), is trying to make itself felt, viz., a differentially speeded traversing grinding disc for cards. Its object is to grind a perfectly straight surface on the wire. It is a matter for surprise that such ideas ever become tangible enough to be seriously considered, but for this particular hobby to become a practical thing is astonishing. It has one advantage though, over some ideas, it works just as well as an ordinary roller. It has cost some thousands of dollars to arrange, and costs its user a higher price; but still it is not useless, as he can use it and get as much good out of it as out of the ordinary Horsfall grinding roller.

Briefly stated, this alleged improved grinding roller consists in being exactly like the ordinary Horsfall roller, but it contains a varying pitched screw instead of the regular screw of the present roller. The variations of the pitch of the screw are so arranged that the disc moves slowly over the ends of the cylinder as it grinds and quickly over the centre portion. The reason for doing this is, that, since the grinding roller bends in the middle, it would grind the cylinder, etc., hollow or concave, but by making the roller pass quickly over the middle portion it will grind less off this part of the cylinder and more off the ends where the roller travels slowly, and consequently a very straight surface is obtained on the points of the wire.

Now this object of grinding is a very important feature of good carding, and any means that will enable us to obtain it ought to be encouraged, but here is a case that has not even the elements of success within it, as the whole thing rests on a fallacy.

Suppose for the sake of illustration that the grinding roller bends in the

middle to the one thousandth part of an inch, such a roller would clearly grind the surface of the cylinder (if placed over its centre) hollow to that extent. Now when we set our grinding roller to grind off, say, one thousandth of an inch, we set the bearings of the roller 1/1000 lower and the grinding roller works and grinds until the roller is thoroughly bedded on its brackets, and when this occurs, no further grinding can possibly take place without again setting the brackets. This is the only possible way of grinding and is adopted for both solid and traveling discs. No grinding roller will be lifted until it has ground off the amount of wire it has been set to do, and it cannot do this until it can fall no lower in its brackets. When shaft fall to the extent the brackets have been lowered, grinding is not finished, and they cannot do this until 1/1000th of an inch has been ground off the whole width of the wire.

For the first few minutes, the traveling disc will grind off less in the middle than at the ends, indeed it must be conceded that the ends will be ground at a much quicker rate than the middle and that the ends will have the 1/1000 of an inch ground off before the middle; but, as the roller passes over the middle of the cylinder, since 1/1000 of an inch has not yet been ground off, the ends of the shaft will not be resting on their bearings, and consequently grinding will be taking place and must continue until the grinding

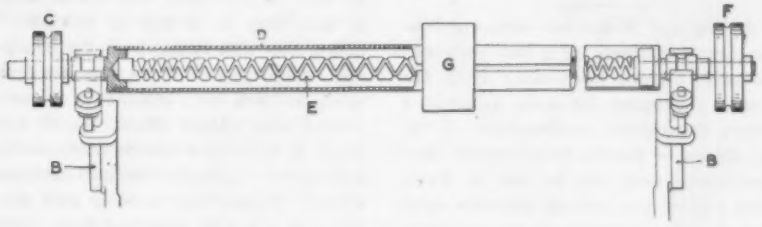


FIG. 21.

it has reached this position, the roller can continue to revolve for weeks and yet grind no further because its brackets prevent it.

Now suppose one of these variably speeded grinding discs are used; it is set to grind off the one thousandth part of an inch, i. e., the brackets are lowered to that extent on each side of the card. It may be added that paper is generally used for setting the amount to be ground off. The roller is first set to just touch the wire, a thickness of note paper being placed under each end of the shaft in the bearing when this is being done. The paper is then taken out and the roller grinds until the ends of the shaft again are bedded or rest on their bearings. When this happens the grinding roller has clearly ground off the wire an amount equal to the thickness of the paper. Until the ends of the roller cannot fall any lower. In other words, grinding must take place until the full amount has been ground off the whole surface of the cylinder. If a manufacturer could employ specially skilled men to constantly watch the grinding so that they could detect the moment when the ends of the cylinder had been ground sufficiently, we should welcome the arrangement; but practically, a roller is put in position and left there grinding for a few hours without the slightest attention. The grinder's experience, or the exigencies of his duties, tell the man to leave the roller at work for 1, 2, 3 or more hours, and in that time sufficient grinding has been done. With a variable traverse disc the ends and the middle of the cylinder will have been ground, and, consequently, whatever the contour of the path the roller may describe, the same contour will be

given to the surface of the cylinder. With a bending grinding roller, the cylinder must be ground hollow whatever speeds are adopted, and to a thoughtful person there will be no difficulty in understanding that, if the lower part of a roller, in passing from one side of the cylinder to the other, describes a curve, as a bending roller would, it will grind off the surface of the wire as it passes backward and forward, and so make an exactly similar curve on the cylinder. It will be readily seen that the speed of the traveling disc will not have the slightest effect on its action or modify the surface it grinds.

Jacquard Designs.

In the last November issue an illustration was given for a leno jacquard design. Before proceeding with the actual designing for such, perhaps a short descriptive explanation of the machines or jacquards on which they are made may not be out of place. The size of the pattern depends upon the weaving capacity of the machine, that is, the number of hooks and needles there are in it. There are what might be termed two systems of tieing up, or building, the harness for weaving this class of goods—the English system and the American. Consequently there are two different methods of designing for such, hence the reason for an explanation.

We will take first the English system, of which Fig. 1 is a rough sketch, giving a side view of the needles, hooks, etc. A is the cylinder around which the pattern cards pass. This is perforated so that when brought into contact with the needles, if there is a hole in the card, it allows the end of the needles to pass into the cylinder leaving the hook on the knife. The knife being raised will come in contact with the hooks, consequently the thread will be raised.

B are the needles and C are the hooks. The marks on the hooks and needles are to show that every needle has a half turn in it, although in some machines the needles have a full turn, into which the hook works, which allows the needle to press the hook from off the knife as desired. The hooks then pass through a grid marked D, on which the ends of the hooks which are turned, rest. Fixed on to the bottom end of the hooks are what are called the neck bands, attached to which are the harness threads. These harness threads pass through the comber board marked E, which is also called the hole board, made in various ways. Sometimes it is made of wood about ¾ of an inch in thickness, and when made in this manner it is fixed directly on brackets attached to the loom. It is also made with wood about ¼ of an inch in thickness, and when made in this way it is put in a kind of frame and this is fixed on the brackets. Some prefer, when this wood is used, to have it in slips, that is, separated into pieces about 1½ inches wide, so that they can be more easily altered if anything should become wrong. Unless the wood is well seasoned it is apt to split and wear very much by the harness twine rubbing against it.

F are the lingoes, or leads, which weight down the harness after it has been raised. It is only necessary that the slackening harness be raised about half the distance of the ground threads or doups so that an arrangement is used similar to the one given in the sketch, where G and G′ are two levers to which the slackening harnesses are attached, which pass through a comber board H.

The mails through which the slackening threads pass are lower than those of the ground harness. Iron rods are fixed across the loom and the threads pass over the back rod and through the mails, then again over the front rod and through the harness. The lingoes on this harness are generally heavier than those on the ground harness. It will be noticed in the crossing of the needles with the hooks, that the 1st and 2d needles are

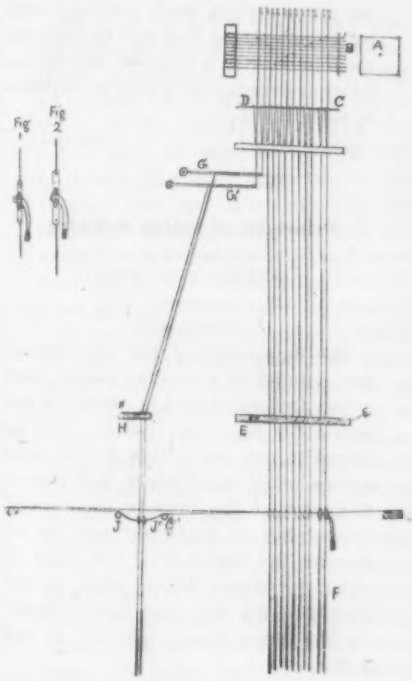
each connected with two hooks one at the front and one at the back. The two at the front are to work the doup standards, and the two at the back are to work the slackeners. By this means we are certain to get the right raising of the slackening harness at the same time the doup standard is being raised.

The threads that are through the slackening harness are also through the doups, so that if it is desired to raise any of the doup standard harnesses by cutting a hole in the card opposite the needle that works this harness, both of the hooks would be left on the knives, and so, consequently, both would be raised, and if they are to be left down, no hole would be cut so that the blank space would press both hooks off the knives, and so would not be raised. The doups are all placed on a shaft, sometimes two are used, and this shaft is raised every pick on account of the pattern working the doups independently of each other. This shaft is fixed in front of the harness as shown at R in sketch.

A very important matter is the setting of the doups, for if they are nicely adjusted they will last quite a time, whereas if they are put in carelessly, it does not take long to wear them out. A doup standard mail is shown at No. 1, which will give the idea. As will be seen, the doup passes through the centre of the mail and the threads are drawn through it. When the threads break, the doup drops down on to the shaft, and this causes quite a little trouble to the weavers until they get accustomed to the working of them.

Mails have also been made, as shown at No. 2. This is arranged so that when the thread breaks the doup is held up, but it is found that in this case the remedy is generally worse than the evil on account of their wearing the doup. They also have the disadvantage that the doups have to be built in them at the loom, whereas in the other case the doups can be built independently, and then taken to the loom.

This short description will give a general idea as to the working of these machines. The principal difference between the American system of tieing up a leno jacquard and the foregoing, is that the harness for the doup standards and the slackeners are tied up independently; that is, the harness itself is divided into three parts, the first for the doup standards, the second for the ground harness, and the third for the slackeners. In the foregoing system the cards are placed over



the front of the loom and the 1st and 2d rows of needles across the top are for the doup standards and slackeners, while in the latter system the cards are over the side of the loom, and a certain number of rows of needles are set apart at each end for the doup standards and slackeners. For instance, a jacquard has, say, 384 hooks and needles with 8 needles in a row. This will give 48 rows of needles, to be divided into three parts, first, eight rows, or 64 needles, for the doup

standards. Consequently, having eight rows for these, there will require to be eight rows for the slackener harness, which leaves 32 rows or 256 needles and harness to figure with. So that it will be seen that on this system the figuring capacity of a machine is reduced; for if on the first mentioned system a figure was required to be made which would occupy the 384 or 400 threads, the extra hooks would be placed across the top of the jacquard, as shown in the sketch. If the design was required on the latter system, more needles would have to be placed in a row to make up the number. It is claimed that on the latter system the designing of patterns is made easier.

THOMAS.

Principles of Cotton Spinning.

ROBERT CUNLEFFE.

(Continued.)

The flats covering the top part of the cylinder in a carding engine play a very important part in preparing the cotton for the next process. We referred in our last article to the moat knives under the lickerin, and also to the teeth of the lickerin themselves. These play an important part in removing the heavy dirt; but neps or short, immature fibres, must be removed by the flats, and also to equalize the fibres being delivered to the doffer.

Often enough the wire on the cylinder here and there has too many fibres, whilst other parts of the wire may be bare. These tufts of cotton require distributing, so that the sliver at the front may not only be regular in weight, yard by yard, but that at any part of the yard there shall be an equal number of fibres. The wire on the flats then will seize the superabundant fibres, and retain them for a certain time. This length of time depends upon the length of the fibre. The long fibres are naturally held more securely by the cylinder, and less securely by the flats, than the short fibres. In fact, when once the short fibres have been presented to the flats, the cylinder is incapable of taking them back again, and this is one of the most valuable effects which render possible the removal of worthless cotton by the card. Of course the full benefit of this part of carding depends in a very great measure upon the wire of the cylinder and flats being in very good order. After combing out the cotton by the wire on the flats, the next thing to do is to deposit it upon the wire of the doffer. Now the doffer is clothed with finer wire than the cylinder.

In passing, I may say that in the opinion of the writer, the doffer should be clothed with finer wire than any other part of the card, though some firms prefer to have the finest wire on the flats. However, the doffer always has finer wire on than the cylinder.

The rule is to have on the cylinder 110s to 120s, flats 120s to 130s, doffer 130s to 140s. Now I wish to point out that these numbers do not represent the number of points to the square inch, as some writers affirm; as the number of points of wire to the square inch is about five times the number of the wire. For instance, 120s wire will have 620 points to the inch.

The object of the difference between the points of wire on the doffer and cylinder, is to give the doffer more points to seize the fibres presented by the cylinder. We shall see that on the same principle of circumferential speed, but in the reverse order, by which the cylinder and lickerin have equalized the number of fibres in a given space by exceeding the speed of the feed, that the doffer, by running slower than the cylinder, further increases this equalization by what may be called condensation. This being something like the principle of doubling in the after process.

It has been argued that the carding engine does nothing towards parallelizing the fibres. We have been told that the work is left entirely for the draw frame, and that the work of the

card is to clean and equalize the fibres. But I think, if what we have said above be sufficiently considered, it will be seen that the card does parallelize as well as equalize. Of course, we do not for one moment say that the fibres are as parallel when the sliver is formed and being passed into the can as they were when coming from the cylinder on to the doffer, but that they are far more parallel than they were when first placed behind the card, I think none will deny.

If we consider the behavior of the fibre whilst under treatment, we shall be able to form more correct ideas. It is said the action of the card should be similar to that of the combing machine. Certainly the nearer we can get the card to act upon the fibres so as to clean, equalize and parallelize, the better; but, under present conditions, it is impossible for the card to treat the fibres as the combing machine; for, whereas the fibre in the combing machine is always held, either at one end or the other, in the card, it is nowhere held after being liberated by the feed roller; and although many improvements have been made in the card the last few years, to prevent air current, yet the fibres are still subject to these currents more or less, and when we stand at the front of a card and see cloudy places in the web coming from the doffer, we shall find, upon careful examination, that the fibres have been disturbed by cross currents of air, which have placed some of the fibres at right angles to the others. But some of the air currents in a card perform a very good service, and it would be to the disadvantage of the quality of carding to prevent them if we could.

No good carding can take place unless the fibres of cotton be kept on the points of the wire. Now, when the fibres are placed on the wire of the cylinder, a certain pressure is brought to bear upon them by the wire on the flats. Does not this pressure tend to push the fibres into the spaces between the wire on the cylinder? If they are there, the wire on the flats is unable to operate upon them. So they should be kept on the top or points of the cylinder wire.

Now the current of air set up by the speed of the cylinder operates upon the fibres of cotton producing this effect. There is a small space between one flat and another, and when the air is passing under the flat, it is, as it were, condensed, and when it comes in the space between the flats it escapes, bringing the fibres with it to the top of the wire, so that in that position it can be operated on once more by the wire on the flats.

We must say a few words regarding the covering of the cylinder or doffer. Great care should be taken in lapping on cylinder and doffer fillets, as so much of the quality of carding depends upon the care with which this is done. The fillet must be put on tightly, but the tightness must be proportional to the composition of the cloth foundation of the wire, and must also bear some relation to the class of work and the speeds expected from it.

Before beginning to cover cylinder or doffer, great care should be taken to see that they are thoroughly clean from oil or grease. The foundation of most of the wire for a card contains more or less india rubber; sometimes a layer of rubber on the upper surface cemented to a layer of cotton cloth beneath; sometimes rubber and cotton cloth, three ply of equal thickness; sometimes rubber above and three ply cotton cloth below containing a great amount of cement; sometimes cloth upper and lower layer of cotton and a thicker layer of woolen between. But as we have said, most foundations contain india rubber. Now oil or grease are very injurious to any combination containing india rubber; so, we repeat, before lapping on, see that all oil or grease is removed.

Before beginning to lap on the wire some people paint the cylinder or doffer. The writer thinks this is a mistake, for should the paint at the time of covering not be dry, and this is often the case, more than might be supposed, the india rubber cloth, of

which the foundation is made, absorbs the oil, and, in consequence, becomes decomposed or rotten. Should the paint be dry, but not absolutely hard, then the crowns of the teeth sink into the yielding substance, and so become fettered in their action; rigidity ensues, then broken wire. Some people prefer to lap the wire on the bare cylinder or doffer. But the iron of the cylinder or doffer coming in contact with the crowns of the wire,—however small a movement takes place, with the speed at which the cylinder runs,—electricity is set up which causes the fibres to stand out and the sliver to look wild and hairy. The best method is to cover the cylinder and doffer with stout calico, put on with freshly made flour paste.

Before beginning to lap the fillet on, what is called a tail end has to be made, in order that a perfectly spiral fillet be put on. This tail-end making has always been considered a great secret with many carders, or other persons whose duty it is to cover the cylinder. We will suppose a fillet is being wound on, containing five rows of teeth, and the diameter of the cylinder is 50 inches. Then $50 \times 3.1416 \div 5 = 31.4$ inches, or very near 31½ inches for each row of teeth in the fillet. Then starting with the end of the fillet, we nail on one row of teeth 31½ inches, then two rows 31½ inches, and so on until we have got to the full width of fillet, which will just bring us once around the cylinder. Then the winding goes on with the full width of fillet until we get to the last time around, when the operation at the commencement must be reversed; that is, remove one row of teeth for 31½ inches, then two rows, and so on to one row for 31½ inches, when the cylinder will be covered with a perfect spiral covering, and no bare spaces left, nor puckering or blistering. Some forms adopt a rather different method to the one described, called inside tail ends. But the method is far more difficult and not so satisfactory as the one already explained.

In regard to the kind of fillet for covering the cards, practical men are not agreed, some preferring iron wire, some mild steel, others prefer hardened and tempered steel. Again, opinions differ regarding the shape, as needle pointed, chisel pointed, side ground, round, double convex, and so on. Consequently, it would be a very difficult thing to say, with any degree of definiteness, which kind of wire is best. But so far as the writer's experience goes, and this is a wide one, and also from conversation with many practical men, the opinion formed is, that mild steel is the best. A difficulty with hard tempered and side-ground wire is the stripping of the flats. Oftentimes, when a card has been working for a time, it has been found necessary to put on a metallic brush in place of the ordinary bristle hair brush, in order to smooth the teeth of the flats sufficiently to allow them to strip. When this brush has worked a certain length of time the flats will strip almost as easily as any ordinary wire; the meaning of it being, that by its constant revolution between the wire of the flats, some of the asperities, caused by the side grinding, in the lower part of the point, have been removed. When this result has been obtained, the carding is found to be irregular and dirty, and further side grinding in places is found necessary. The polishing process, it would seem, must weaken the hold of the teeth, and, according to the varying temper of the steel, and the compactness of the cloth, some will be lower or higher, as they will not all spring back to their original position. This may be seen in any hardened steel cards which have worked a year or two. Besides this, polishing is an extra work which ought not be required to be done when a card is clothed and ready for work.

It may be said as an axiom, that the less you have to strain the wire, when once on the card, the better. The reason that the carding becomes dirty, as soon as the side-ground wire is polished, is that the asperities being re-

moved the tapering spaces between the wire have less power to retain the dirt and fly, which consequently go with the good cotton; and the reason of the irregularity is that a large percentage of the power of holding the long cotton, has also been removed, and the fibres are taken more in tufts or bunches.

Making Good Cloth.

The above subject is one that has been much written about, and is of such vital importance to the success of a cloth manufacturing firm, that no wonder, when we consider the various processes through which the cotton has to go, before it reaches the weave room, the greatest care must be exercised and required. Hence the necessity of having a person at the head who is thoroughly competent and who can discern at a glance anything that is not quite as it ought to be, and be able to dictate and rectify it immediately.

We often see and read of various improvements that are being made in looms. For what are all these improvements, but to reduce the cost of labor, as far as it is possible, to a minimum, and to make more perfect cloth? One instance will suffice, that of the various motions which have for their object the stopping of the loom should a thread break, and thus preventing what would otherwise be an imperfection in the woven fabric.

There are various causes by which poor cloth is made, and a few of these will be noted, beginning firstly with plain cloth. If the warp that has been placed in the loom is soft, that is, sufficient size has not been added to it to give it strength to resist the strain, wear and tear that it has to undergo while cloth is being made, we shall have, as a result, a most imperfect piece of goods, due to the fact that the threads would be continually breaking, causing a loss all round both to weaver and manufacturer.

The object of sizing the yarn is evidently to press into it a mixture of suitable ingredients whereby the yarn may be strengthened, and we should certainly see, as far as it is possible, that the size penetrates into the yarn, in fact, actually becomes a part of the yarn itself, for, unless this is the case, the size will only be on the outside of the thread where it will not be of much practical value.

Good material is a necessity if we are to produce good cloth, and no matter how capable the overseer of a department may be, or how good the weaver, if he is supplied with poor material it cannot reasonably be expected that the production will be as good as when good yarns are supplied.

Much depends also on the setting of the harnesses and the harnesses themselves. If the harnesses are not set as they should be, we shall have a faulty cloth; or it may be we are using harnesses that had been previously used and damaged, but in order to save the expense of new harnesses, these are again used. If the harness is very much damaged and has not been fixed up while out of the loom, it is poor policy to use it over again, so the best plan is to use a new harness in the first place. As the tendency of cotton is to stick on whatever is the least bit rough, we should see that the new harnesses are smooth and free from grit of any kind, else the little black specks which are seen occasionally will be very troublesome. These are caused by having dust or dirt flying around when the harnesses are being varnished, and when weaving they act much like a knife on the yarn, causing it to break.

Another most important point is to have a good selvage. The very first thing that the eye seems to rest upon is the selvage. When the cloth is first taken in the hand, almost unconsciously, as it were, we are looking at it, or as it would perhaps be more correct to say, the selvages are examined the moment the eyes are cast upon the cloth, and if they are poor, cockled, baggy, threads hanging loose, they considerably detract from the

appearance of the cloth, no matter how good it otherwise may be, often being the cause of the cloth being rejected.

Another evil, and what seems to give a considerable amount of trouble, is uneven cloth. This is due to various causes, such as an uneven let-off, an uneven take-up, crank arms loose, etc.

Plain cloths have frequently to be made on which "cover" is largely required, and in order to obtain this cover the harnesses may be set as follows. Suppose a straight line was drawn from the breast beam to the back rest. If, when the harnesses are crossing each other, the line formed by the warp is below the straight line, cover would be got on the cloth, because the harnesses, being set lower than the plane, with the upper half of the warp raised, would make the yarn slacker than the lower half, and when the reed is beating up the filling, the slack threads would be spread in between the tight ones, and so a cover would be obtained. If, when forming the shed for the shuttle to pass through, there were an equal strain on both halves of the warp, no cover, or very little, would be obtained.

It is this system of putting on cover that is the cause of many accidents in the weave room, owing to the upper half of the warp being slack. Should a thread break and get entangled in front of the harness, the shuttle is liable to fly out. There is the greater liability, also, that when a thread breaks, it will become entangled with adjacent slack threads and cause them to float together, causing a bad place in the cloth. These have to be picked out, and if this is not done in a skilful manner, will cause another bad place to be made.

There is considerably more trouble in starting up a fancy warp than a plain warp, for frequently the only thing that requires to be done, after tieing in the threads, on the plain warp, is to attach the harness straps to the levers, and the loom is ready for starting up. But in a fancy loom almost every time a warp is started up something or other has to be changed or altered.

Much depends on the starting up of the warp and the setting of the harnesses, as to whether good weaving and consequently good cloth will result. If the harnesses are placed in the loom in a careless manner, good results cannot possibly be expected. Great care is required, especially when we are making, say, an open work effect, mock or imitation leno. The peculiarity of these weaves are that the threads and picks are not equally distributed, but run in groups, the centre threads and picks which are floating, close over those that are interweaving and lie in ridges. Three different weaves are given, where it will be seen how the threads and picks are formed to make the ridge, the first being a 4 and 4, the second 5 and 1, and the third 5 and 5.

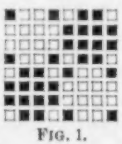


FIG. 1.

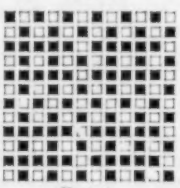


FIG. 2.

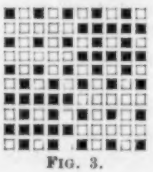


FIG. 3.

Unless exceedingly great care is taken with these, there is the liability, owing to the unequal intersecting of the threads, that the filling will curl. This will cause a rough looking piece of cloth, which considerably detracts from the value of it. The warp is generally woven at a tight tension. An uneven shed caused by some of the

harnesses being lower than the others, will cause the filling to curl and will also cause a bad selvage.

In a leno cloth the doups are one of the most troublesome things a weaver has to contend with. If these are set right in the first place, they will last quite a time, but if not set to work right and in unison with the other harnesses, they will soon be cut through, and the result will be a badly woven fabric. For instance, if the doup standard were being raised for a pick, then the doup would also have to be raised at the same time. If this was not done, the extra strain that would be put on the doups would soon wear them out or cut them, and also, when the harness is being raised, the slackener has to be raised sufficiently to take the strain off the doup. If not done, this will have a tendency to wear out or cut the doups, and at the same time, would probably break out some of the threads that cross over the doup, unless they are extra strong. If, for instance, a diamond effect was being made with a thick cord about, say, 8/32, and the doups were continually breaking, the effect would be completely spoiled.

WEAVER.

Wages in Cotton Mills.

In the testimony that was advanced in the taxation suits by a number of the Lowell corporations against the city of Lowell, one of the witnesses gave the following facts concerning the wages paid to cotton mill operatives:

Overseers in the ring spinning room get $24 per week; second hands, $15 per week; section hand, $8; bobbin boy, $6; scrubbers, $3.78; cleaners, $3.48; sweepers, $3.48; spinners, $5; general hands, $5; yarn hands, $6.08; band boys, $2. In another room the overseer gets $25; spinners, $4.65; doffers, $5.35; scrubbers, $3.78; band boys, $4.06; roving hands, $5.63; yarn, $6.67; cleaners, $3.72.

In the mule room, there the overseer gets $30; second hand, $15; section hand, $12.18; roving hands, $6.38; doffers, $5.20; back boys, $3.50; spinners, $12; yarn hands, $6.38; clerks, $3.78.

At warping and dressing the overseer gets $18; second hands, $12; slasher hands, $9.20; helpers, $4.04; drawing in girls, $6; helpers, $7.25; warper tenders, $6; two at $6.65; tie over girls, $4.95; carrying beams, $6.50; harness brushers, $5.90; clerk, $7.00; reed and harness man, $6.24; sample hand, $6.96; one scrub, $4.80.

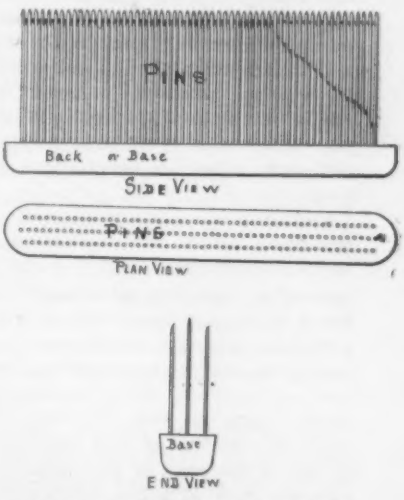
Spooling room, second hand, $12; room girls, $4.90; tenders, $7.00; section, $7.83.

Weaving department, overseer, $30; second hands, $13.50; 1 section hand, $11.02; 61 section hands, $10.09; filling men, $7.25; 21 room girls, $6.28; scrubbers, $3.78; clerks, $7.50; general men, $6.38; 389 weavers at $7.50; 6 weavers, $7; 690 weavers at $6.25.

In the yard the overseer gets $20; second hand, $11.02; third hand, $7.25; night watchman, $10; outside watchmen, $12.60; day watchmen, $8.47; teamster, $10.10; cotton weigher, $10; engineer, $13.63; fireman, $9; brakeman, $7.25; yard men, $6.38.

Pick-out Comb.

There have been many devices for the use of weavers, of combs for



scratching up or picking out threads, such as appear upon imperfect, or thin places, in the cloth. We give, here-

with; an illustration of a recently invented comb for this purpose, which is said to be convenient and effective, and which will enable the weaver to accomplish double the quantity of work that the ordinary comb will do. We give three views of this comb, which are largely self-explanatory.

Heretofore in this class of weavers' combs the comb has been provided with but a single row of pins or teeth and is operated by strokes of the hand to pick out and scratch up imperfect or thin places in the cloth. The purpose of this comb is to provide one which will accomplish as much work with one stroke of the hand as can be accomplished with two strokes when the ordinary single-row comb is employed.

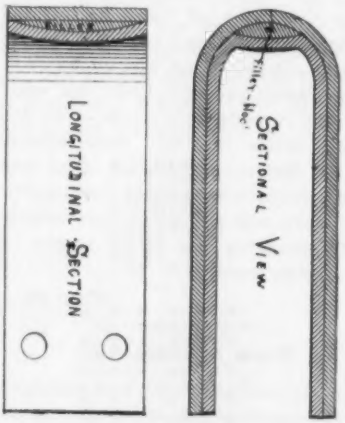
In this comb there is provided a plurality of longitudinal rows of pins, or teeth, which have the points, or outer ends, of one row projecting beyond the points, or outer ends, of the adjacent row. Three rows of pins, or teeth, are preferably arranged in longitudinal and parallel positions. The outer ends or points of the middle or intermediate row of pins project a slight distance beyond the ends or points of the pins of the outer or side rows, the ends or points of the pins of the outer or side rows being on a corresponding plane with relation to each other. The extent of projection of the points of the pins of the middle row beyond the points of the pins of the side rows is in practice preferably about one-twentieth of an inch.

The operation and advantages of this device will be readily understood by those skilled in the art to which it appertains, and the advantages secured by having three rows of pins with the points of the middle row projecting beyond the points of the side rows is apparent. When scratching up or picking out with this comb, the comb may be held so that the points of two of the rows of pins will bear upon the cloth, so that a double quantity of work is accomplished at each stroke of the hand.

Lug Strap for Loom Picker Sticks.

We illustrate, herewith, a new kind of lug strap for loom picker sticks, made of leather. The object of the construction of the strap here shown is for the presentation of a round bearing for the stick, the bearing being hardened and presenting a compact surface, which will afford an enduring resistance to the wearing action of the stick. The hardened surface in the case of a leather strap is the grain side of the leather.

Ordinarily, leather lug straps consist simply of two pieces of leather glued or cemented together and bent into U shape; but such lug straps wear rapidly, owing to the action of



the picker-stick upon the upper and lower edges of them where the stick comes into contact with the strap at the bend or bow. Attempts have been made to overcome this objection by securing upon the inside of the strap at the bowed or bent end, a rounded block of leather, which will present a curved surface for the action of the stick, but this is oftentimes objectionable, because the constant blows of the stick upon this block tend to displace it, and because it does not present a smooth, hard wearing surface to the stick.

In making these straps, the two leather strips are secured with the flesh sides contiguous, so that the

grain surfaces of the leather are presented on the inner and outer sides of the straps. Between the two strips, a filler block, as may be seen in the illustration, of leather, or other available material, occupies a position at the bend or bow of the strap, so as to cause the inner strip to present at the bend a vertical or lateral curve or convex face.

The strap, before it is fitted for use, is subjected to heavy pressure, between suitable dies, so as to compress and compact the leather at the bow or bend of the strap, thereby hardening, smoothing, and polishing the grain-surface of the leather on the inner strip, so that the curved or convex bearing for the picker-stick will be well calculated to resist the wear of the stick and will thereby materially increase the term of usefulness of the strap.

Mercerizing of Web Fabrics.

A recent English invention comprises improvements in the mercerizing of web fabrics composed of cotton or other cellulose fibres by which a silky appearance is imparted, while the web is prevented shrinking during the process. The fabric is first treated while passing through a chain stentering machine of ordinary construction and fitted with either clips or pins. At the cloth-entering end the side bars with the chain races dip into a trough fitted across the machine. On a transverse shaft fitted in bearings on each side of the machine two large toothed wheels are mounted so that their teeth engage with the links of the chain and cause them to pass along the curved part of the race to the bottom of the tank, and so carry the cloth conveyed by them through the chemical bath therein. The wheels may be mounted on vertically adjusting studs on each side of the machine frame instead of on a shaft, or they may be dispensed with and the chains made to travel in the curved part of the race by other guiding means. After leaving the bath the cloth is made to pass between a pair of rollers to press out any excess of solution, or a pressing blade may be used. A series of perforated pipes are ranged transversely over the machine, from which sprays of water are projected on to the cloth to wash out the solution, the washing water falling into a tank or other receptacle below, and the cloth afterwards passes off the stentering chains preferable to a beam, on to which it is rolled. Instead of perforated pipes projecting sprays of water on the cloth, an arrangement similar to that for mercerizing may be used, and the cloth made to dip down into the water. The cloth is afterwards passed through a slightly acid solution or other agent to neutralize any trace of the mercerizing solution, and is then dried or otherwise treated as desired.

—The question is often asked what rule a reed maker has for spreading the dents for a certain sley and to produce certain widths of cloth. It will be safe to allow seven per cent. for shrinkage in weaving, but it is impossible to give a rule that will work the same in all cases, but for an illustration: Suppose we want to manufacture 40 inch, 80 sley goods that calls for 3,200 ends, and to bring the goods 40 inches from loom we will add seven per cent. to the width of the cloth and set the reed 1,600 dents on 42 $^{80}/_{100}$. This is as near as the reed maker can come, and under proper conditions will give the desired results, but the weighting of the warp or adjusting the temples and beating in the filling may vary the width of the goods, and it will be found that in the same mill on different looms in the same reed the width of the cloth may vary a half inch or more, but for this variation the reed maker cannot be held responsible.

—Men who are not practical shepherds become attached to principles and theories and leaving out of consideration the force of circumstances in determining the course of the shepherd.

WOOLEN DEPARTMENT.

Ingenuity in Modern Textiles.

CHARLES E. WILES.

ARTICLE V.

(Copyright.)

In Figure 12 is given the plan for a double fabric designed in a striped style, for trousering wear, having the warp threads one of face and one of back alternately, and the picks two face, one back. The crossing for both the face and back textures is prunelle or two and one twill, and on both sides the twill is angled; the right-hand section, in which the twill runs to the right, should be continued for 96 threads.

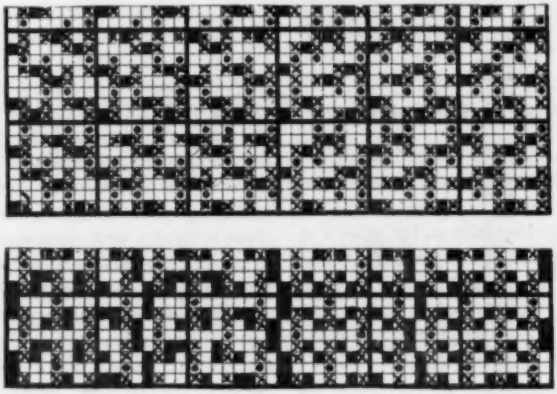


FIG. 13.

Three colors of yarn are employed in the warp, two shades of blue slate and black, their distribution being thus:—

ORDER FOR FACE WARP.

2 threads blue slate, light shade.
2 threads blue slate, medium shade.
2 threads black.
2 threads blue slate, light shade.
2 threads blue slate, medium shade.
2 threads black.
2 threads blue slate, light shade.
1 thread black.
2 threads blue slate, medium shade.
1 thread black.
2 threads blue slate, light shade.
1 thread black.
2 threads blue slate, medium shade.
1 thread black.
2 threads blue slate, light shade.
1 thread black.
2 threads blue slate, medium shade.
1 thread black.
2 threads blue slate, light shade.
1 thread black.
2 threads blue slate, medium shade.
1 thread black.
2 threads blue slate, light shade.
1 thread black.
2 threads blue slate, medium shade.
1 thread black.
2 threads blue slate, light shade.
2 threads blue slate, medium shade.
2 threads black.
Total—60 threads.

Backing warp to be same in order as the face, and the weft all black.

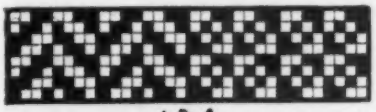
COUNTS OF YARNS, ETC.

Warp:
All 2/48s worsted.
24s reed 5s.
Weft:
1 pick 2/48s worsted.
1 pick 32 skeins wool (backing).
1 pick 2/48s worsted.
120 threads and 90 picks per inch.

In treating of woolen coatings, brief reference was made to that important type of designing for what are technically alluded to as cut double cloths. These textures are probably of more common occurrence in worsted goods than in woolens, and certainly much smarter and clearer "cuts" are obtainable in the former fabrics than

the latter. For coatings, particularly, are they adapted, generally being used in conjunction with solid coloring.

An example of this scheme of cloth structure applied to a trousering style is given in Fig. 13, affording a firm texture having ribs running lengthwise about an eighth of an inch in width. The face weave is shown at Figure 13A, and in the full design the cuts,



13 A

are formed on the 1st and 48th, 12th and 13th, 24th and 25th, and 36th and 37th threads, the backing of the cloth being woven plain.

PARTICULARS FOR WEAVING.

Warp:
1 thread 2/48s worsted—black.
1 thread 2/28s worsted—black.
2 threads 2/48s worsted—dull slate shade.
1 thread 2/28s worsted—dull slate shade.
2 threads 2/48s worsted—dull slate shade.
1 thread 2/28s worsted—dull slate shade.
2 threads 2/48s worsted—dull slate shade.
1 thread 2/28s worsted—dull slate shade.
1 thread 2/48s—black.
16s reed 6s.

Weft:
1 pick 2/48s Worsted—black (for face).
1 pick 20 skeins Wool- black (for back).
96 threads and picks per inch.

Worsted Suitings and Trouserings:—A considerable proportion of these goods, comprising some of the neatest and most effective designs on the market, may be classed under the general head of check patterns. The checked character may be imparted either through the medium of the weave by such devices as reversing, cutting, and combining different crossings in one plan, or it may be due solely to a sys-

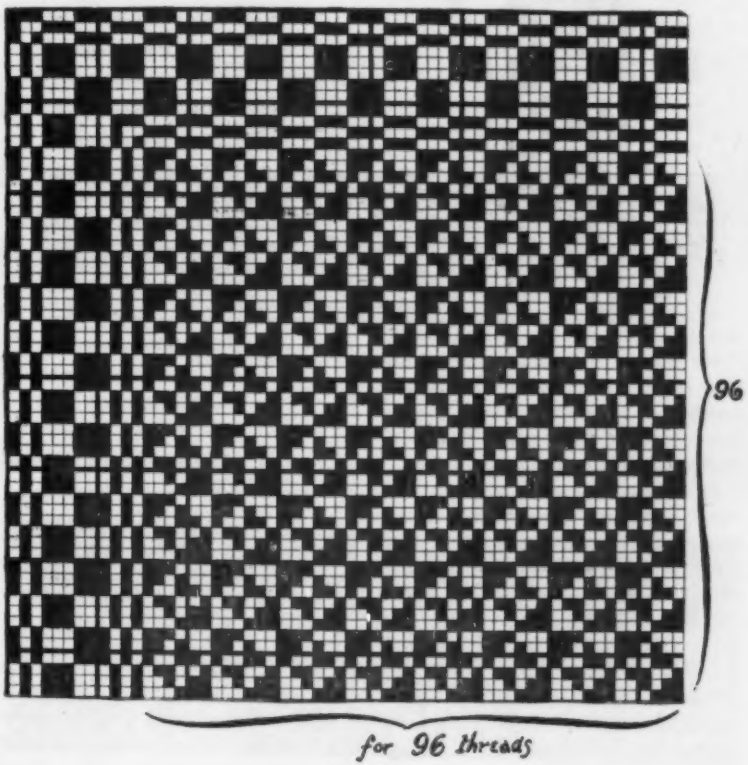
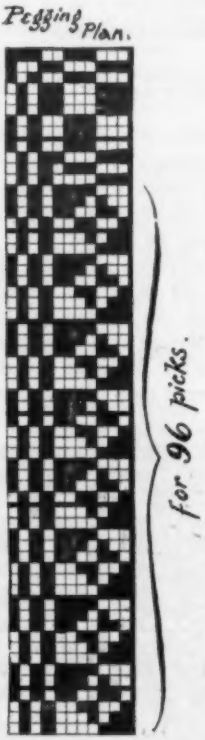


FIG. 14.

tematic arrangement of colored yarns in conjunction with an elementary type of weave, rendering the production of large, small, or shaded effects



simply a matter of taste; or, thirdly, there may be the combination of plan and color, which is an operation requiring a somewhat more extended knowledge of the possibilities in design than either of the foregoing.

In Figure 14 a plan is given for a check style, the check being entirely due to weave manipulation, and well adapted for producing in solid shades of color. The various weaves are derived from the common six-shaft twill base, and the whole design is draftable onto eleven shafts, as will be seen from the pegging plan and draft which accompany it. (Figs. 14A and 14B).

Particulars for reproducing this pattern in the loom are as follows:—

Warp:
All 2/48s worsted—dark brown and green mixture.
16s reed 6s.

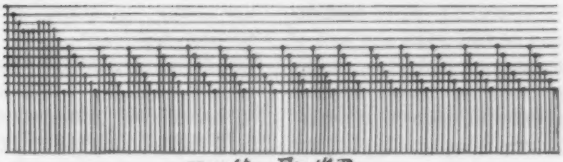
Weft:
2/48s worsted—dark brown and green mixture.
96 threads and picks per inch.

In the next example, the design for which is composed of ordinary two and one prunelle twill, backed with warp, one thread face yarn and one thread back (Fig. 15), the check appearance is entirely a result of the order in which the threads and picks are arranged as regards color. A perusal of the weaving data subsequently given will clearly indicate the manner in which this is effected, and it should be remembered that owing to the texture being warp-backed, the colorings set down for the warp are double those for the weft.

Warp:
6 threads 2/56s worsted—dark slate shade.
6 threads 2/56s worsted—lavender shade. } for 144 threads.
4 threads 2/56s worsted—dark slate shade.
2 threads 2/56s worsted—lavender shade.
2 threads 2/56s worsted—dark slate shade.
4 threads 2/56s worsted—lavender shade } for 96 threads.
6 threads 2/56s worsted—dark slate shade.
6 threads 2/56s worsted—lavender shade.
4 threads 2/56s worsted—dark slate shade.
2 threads 2/56s worsted—lavender shade.
2 threads 2/56s worsted—dark slate shade.
4 threads 2/56s worsted—lavender shade. } for 96 threads.
21s reed 6s.

Weft:
3 picks 2/56s worsted—dark slate shade.
3 picks 2/56s worsted—lavender shade. } for 72 picks.
2 picks 2/56s worsted—dark slate shade.
1 pick 2/56s worsted—lavender shade.
1 pick 2/56s worsted—dark slate shade.
2 picks 2/56s worsted—lavender shade. } for 48 picks.
3 picks 2/56s worsted—dark slate shade.
3 picks 2/56s worsted—lavender shade.
2 picks 2/56s worsted—dark slate shade.
1 pick 2/56s worsted—lavender shade
1 pick 2/56s worsted—dark slate shade
2 picks 2/56s worsted—lavender shade. } for 48 picks.
126 threads and 68 picks per inch.

If a fair contrast be preserved between the selected shades for light and dark, this arrangement will afford a check style of agreeable quietness and softness.



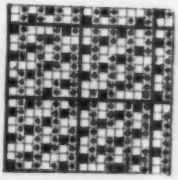


FIG. 15.

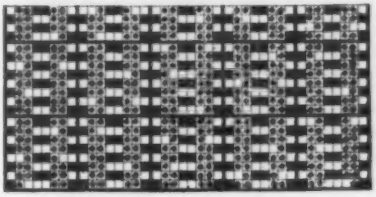


FIG. 16.

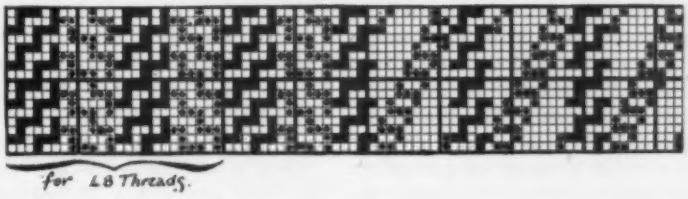


FIG. 17.

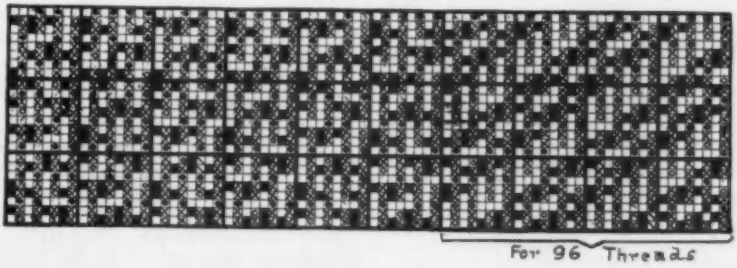


FIG. 18

Figure 16 shows a simple weft cord weave with a floating warp backing arranged two of face yarn and two of backing, alternately, and when woven in solid colored yarns of suitable counts, it produces a smart style for coatings. The following particulars for weaving are suggested:—

Warp:
1 thread 2/40s worsted for face—dark blue.
2 threads 2/25s worsted for backing—dark blue.
1 thread 2/40s worsted for face—dark blue.
16s reed 6s.
Weft:
All 25s worsted—dark blue shade.
96 threads and 72 picks per inch.

Fancy stripings in the ordinary "double-plain" crossing, and also in combinations of this weave with other makes, appear to occupy a permanent position in worsted goods. They are mostly designed for trousering wear, although a very fine light stripe set at suitable intervals on a solid dark ground gives a fabric well adapted for suitings.

The design shown in Figure 17 gives an indication of the way in which combinations of the "double-plain" weave with others may be effected. In this instance, an eight-shaft small diagonal has been introduced into a six and six double-plain stripe, and wherever a repetition of the eight-shaft crossing occurs, silk threads are arranged in the warp, which, floating, give a series of small lozenge effects in one solid shade down the piece. Instructions for making this cloth are here appended, the order of coloring being reckoned from the left-hand side of the design:—

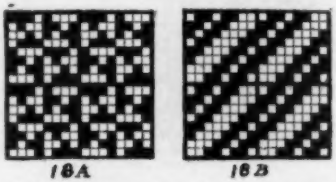
Warp:

for 60 threads.	1 thread 2/56s worsted—black.	for 6 threads.
	1 thread 2/56s worsted—blue slate shade.	
	1 thread 2/56s worsted—blue slate shade.	for 6 threads.
	1 thread 2/56s worsted—black.	
for 39 threads.	1 thread 2/56s worsted—black.	for 4 threads.
	1 thread 2/56s worsted—blue slate shade.	
	1 thread 2/56s worsted—black.	
	8 threads of 5 dram silk—light shade.	

To be sleyed in an 18s reed with the first sixty ends drawn ten in a dent and the remainder alternate fives and threes.

Weft:
1 pick 2/56s—blue slate.
1 pick 2/56s—black.
90 picks per inch.

In colored warps where an elementary order of colors is maintained throughout, well marked stripe patterns having widely differing effects in each adjacent section are produced by employing different schemes of crossing for each part, but when doing this it should be carefully watched that only those weaves which will work well in combination are used. Plans 18A and 18B, each complete on eight shafts, have been utilized for the face cloth in the stripe design given at Figure 18. The structure is


18A 18B

double, being arranged one thread of face and one thread back, warp ways, and two picks face to one pick back in the weft. The face weaves are shown in solid squares, and the crossing for the under cloth in dots. Crosses indicate the depression of the backing threads where a face pick enters the warp, and the circles are to show where a backing warp yarn is lifted over a face pick to stitch the two cloths together. This design, if woven according to the following directions, produces a striped pattern, the two face weaves giving effects dissimilar in character, but not so greatly at variance as to render the resulting style an incongruous one.

Weaving particulars:—

Warp:
8 threads 2/36s worsted—light gray shade.
8 threads 2/36s worsted—black.
19s reed 6s.
Weft:

2 picks 2/36s worsted—light gray shade.	for 6 picks.
1 pick 8s worsted—black.	
2 picks 2/36s worsted—black.	for 6 picks.
1 pick 8s worsted—black.	

114 threads and 90 picks per inch.

—Numbers of railroad collisions, shipwreck disasters, etc., have undoubtedly been caused by the inability of the men in charge to distinguish between red and green lights.

Woolen Manufactures and Processes.

How far will it spin? is a question of great meaning in the woolen and worsted trades.

Counts become the standard qualities of the trade, whether applied to wool after the sorting process, the tops after the combing process, or the spun yarn, whether spun to its limit or any thicker count. This classification relates to the processes, commencing with the wool-sorting, and differs from the classification at the London wool sales, farmers' markets, and wool fairs, where the classification is that of the breed of the sheep and the locality where grown. When the quality is quoted by counts, it denotes that the wool is no longer in the fleece, but has entered the processes.

Taking, then, a 32's quality as the lowest standard employed in the manufacture of worsted coatings, serges, and woolen goods—since any quality below 32's often shows a sprinkling of dead hairs, named kemps in the trade, and which do not accept colors in dyeing,—we may examine its characteristics under manipulation. The fibres of a 32's quality are strong and wiry naturally, but when spun to the limit of 32 hanks to the pound weight, each hank containing 560 yards, the amount of twist required in the spinning seems to harden the fibres still further, and renders the yarn unfit for cloth goods. The quality seems spun to death, and a coating made from it handles harsh and crisp, and has an inordinate tendency to glaze and shine in process of wear. Very few manufacturers have surmounted this tendency, yet it can be considerably modified, it not eradicated, by judicious manipulation.

The cross-bred wools from New Zealand, which are a mixture of the English and the merino breeds, have a corresponding length of staple, but a much softer fibre. The combed wool from each—termed tops in the trade—can be mixed together in process of drawing by combining the slivers, say, 2 by 2, 3 by 1, 2 by 1, as desired, the 2 by 2 being perhaps the best proportion.

The lap waste, made when spinning alpaca, can be recombed and the slivers mixed with wool slivers in the manner previously described. Its soft and fine fibres have a softening effect upon the hard wool, but the lap waste should be selected and free from kemps, with which some alpaca wools are much infested. The brown-gray color of the alpaca is no detriment to the dyeing of blacks and blues, which are the predominating colors. Finished with a clear face, this cloth gives the lowest quality of worsted coating which can be successfully produced, and one that is acceptable in various markets, the Bismarck twill, 3 by 3, being the most favored weave.

For rough-finished serges, which require thicker spun yarns, a minimum of twist is sufficient, and softens this grade of yarn still further. An excellent cloth is produced from these, 21 ounces in weight, and suitable for the ready-made clothier.

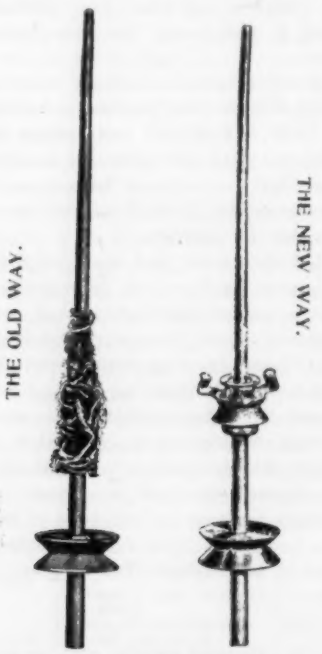
Let us ascend the scale only two counts in quality—i. e., from a 32's to a 40's quality of English wool. The previous remarks as to small spinning and thick spinning still apply, but much depends upon the class of wool selected. Mohair excepted, the writer doubts if any class can excel the choice Shropshire fleeces. Brilliant to a degree, of medium staple, yet neither too soft nor too hard in fibre, the acme of a high-class serge seems here to be reached.—Textile Manufacturer.

—By allowing caustic soda or caustic potash to act upon animal or vegetable oils or fats, a double decomposition takes place; the glycerine is liberated and the alkali combines with the fatty acids to form oleate, margarate, or stearate of soda or potash, a combination known as soap.

—The soaps of commerce may be divided into three classes, namely, hard, medium and soft.

Bobbin Holder and Thread Catcher Combined.

We illustrate a device that will be appreciated by manufacturers, that is controlled and sold by the Burr Bobbin Holder and Thread Catcher Company, Hartford, Conn. It is the invention of a practical mill overseer of many years' experience, who saw the need of an attachment to overcome the many defects in the old method of yarn spinning. In order to prove its real worth, the owners of it have had it tested in different mills, for spinning carpet yarns, the strongest kind of yarn for army cloth, etc., as well as on twisters and winders,



believing that if it could endure these tests, which we understand have been under way for many months past, it certainly should do good work on all kinds of mule spinning. Some of the savings that are represented to be realized by manufacturers, having their spindles fitted with this device, are as follows:

Saving the packing on spindles and the time of putting it on.

Causing bobbins to run true by being held firm from a common center, and not allowed to wobble from uneven yarn packing.

No split bobbins, or packings to pull off.

Bobbins are always even with top of spindles, and no trouble arises from having to readjust them, such as the yarn winding below the shoulder, causing it to break in weaving, necessitating the stopping of the loom. But insures even thread and no waste cloth.

Prevents slack twisted yarn which makes streaks in the cloth, causing it to cockle in fulling.

Saves the use of a stick for driving on and starting off the bobbins, thereby splitting many of them, and causing all to be roughened or bruised on top.

Saves bending the spindles, and wearing flat places in them, causing work to spin badly, and making poor yarn from uneven twist.

Saves time in cutting off from under bobbins, besides increasing the production of a mule from one to two hours each week, saving two to six pounds of yarn on every mule or winder operated. Is neat and durable, quickly and securely put on, and protects spindles from the hard usage which they received by using the stick in the old manner of spinning, thereby adding to the lifetime of the same.

We direct special attention to their value on winders, where waste is so great.

—Silk is the one great textile industry in which France is pre-eminent, and so little does she dread competition that she scarcely resorts to her system of protection at all.

—The gauze style surmounts a difficulty by crossing each gauze thread (every pick) over a few threads, occupying about two dents space, and in this way it forms a solid colored corded stripe on a white or striped ground.

KNITTING DEPARTMENT.

The Knit Goods Situation.

The knit goods trade in New York has been steadily improving for three weeks, and it is doubtful if there has been greater activity for years than that which now prevails. The increase has been so gradual, few realized the proportions it was assuming.

Jobbers are especially busy, which seems queer, in view of the talk indulged in by certain market reporters, who have insisted that shrinking margins were forcing retailers to buy direct, making the passing of the middleman only a question of the near future. It is true more buyers have been seen in New York the last seven or eight months than for two or three years preceding, but jobbers are nevertheless holding their own in a way that does not make them objects of sympathy. The jobber is destined to live long enough to attend the funeral of many a wholesaler and manufacturer's agent.

Importers, too, are fully engrossed and are not allowing nice green lawns to grow under their feet. In fact, importers were never a greater thorn in the side of the domestic contingent. They are doing themselves proud, their assortments and qualities breaking all records.

The recent decided advance in cotton has helped the light-weight business, particularly in underwear, not only in price, but by quickening the call therefor. The general advance in factory wages and the continued seasonable weather, are other leading factors in bringing about the desirable conditions that now prevail. Business is now estimated to be fully 20 per cent. ahead of last year, on an average, and some far-sighted houses are credited with one-third increase in traffic.

If present demands continue long, it is evident that the combination which has been talked of for months in a desultory way will retire into the dim future, although the need of some unifying agreement promises to increase rather than diminish. Close contact with the trade does not yet reveal anything like the crystallization of sentiment for a combine. Three-quarters of the trade are crying out more bitterly than ever against insufficient margins, but not one in ten would promptly join a combination, if one could be formed.

As trade has improved, of late, more call is noted for medium and fine grades of all goods which is, after all, the most helpful element in the situation.

To begin with hosiery, fine fancies are looking up. Some uncommonly rich designs are shown in wide vertical stripes and large dots. These patterns in cheap goods would be unbearable, but with fine dyes and the best of stock and workmanship, their effect is irresistible to the fine trade. Even the quotations on medium and low grades of seamless, which have been dragging near the bottom of the heap, show less anxiety to close deals.

Stocks of imported lace hosiery are slowly, but steadily, dwindling. Staples, as usual, are taking good care of themselves. More variety, in this department, is to be noted in black ribbed goods, which have been gaining in a modest way for many months.

Domestic fancies are yet a long distance from coming into competition with foreign makes, but the better varieties were never as well and sensibly put together as now, so that they are carving a niche for themselves in the market.

In golf stockings, hand knit lines are surely being displaced. The trend is toward lightness. Cashmere goods promise to be in increasing popularity

among golfers. Welts are as far as the fancy part of most of the golf novelties go. More cottons are offered in golf goods than ever before, but their request remains to be seen. Judging from last season, the slow introduction of cotton can be counted.

In underwear, combination suits appear to be gaining day by day. There is no disputing the fact that the heavy-weight trade has been slower proportionately than any other lines. The craze for cheap fleeces has served a melancholy purpose,—to concentrate competition under that head, instead of dividing it, between low mixed wool grades and flat cottons of cheaper qualities. This is rather a temporary than a permanent harm, for cotton can never succeed wool for more than the time being. In the end, it is likely to send the crowd back for even better wool goods than before, but rain is none the less wet because breaking skies can be seen in the distance.

It is to be noted that foreign advices, while sanguine, as for several weeks past, are more or less speculative, usually more.

Knit Goods Industry in Cohoes.

A number of knit goods manufacturers have recently favored the Evening Dispatch, of Cohoes, with interviews that reflect interesting, but not wholly satisfactory, conditions of the knit goods industry in that locality.

This paper comments on the status to the effect that there is something the matter with the Cohoes knit goods industry, yet it is evidently not so great that it can not be overcome. Of the thirty or more knit goods plants in the city, probably half are in partial operation, which is not a good showing when we look back at the time when they were all being run to their fullest capacity. There are other mills that have not been run for several years, and these big plants are idle capital in the hands of the owners.

Cohoes manufactures the heavy woolen goods, or flat goods, as they are known. There are mills making plush, novelty, balbriggan, etc., but the major portion of the mills are equipped for flat goods. Within the past few years inroads have been made on the flat goods trade by the fleece-lined article, as well as by the heavy ribbed goods.

In the interviews, we gather the following points. Through the Mohawk Valley, where a great many mills are running, as at Amsterdam, Little Falls, etc., it is found that fleece lined goods are largely made. These garments are said to be almost as heavy as the woolen garments, looking very neat and attractive, and though not so durable, catch the eye of the purchaser, who, seeing one of them for 50 cents, takes it in preference to a wool garment for $2. These fleece lined goods are made from cotton, with a heavy nap, and are thought to be something that has come to stay. One manufacturer gives it his opinion that he who gets in on the ground floor now will be the one to start his mill profitably. It is thought that, in consequence of the utility of these garments, a wool garment will be in much less demand than heretofore.

One manufacturer was asked the cost of changing the machinery, etc., so that fleece lined goods can be made. He thought that the cost would not be great, inasmuch as all that would be needed would be a napper, and the changing of the burs on the knitting machine, as well as a few other minor changes.

Other manufacturers take a somewhat different view of fleece lined goods, and say that there is no money in them, because there is no bottom to prices. The market is too unsteady, and many are ready to think that a further drop will be experienced. These goods are represented to sell at from $2.65 to $3.25 a dozen, while the cheapest flat goods go for $4.50. One case is cited where a buyer of fleece lined goods refused to pay $3.50 a dozen for a garment this

year, which was easily worth this, because he said he could get the same garment from another manufacturer for $2.65.

Another manufacturer said that he would fit his mill up to manufacture fleece lined goods, if he could see where it would benefit him any. He feared that after the necessary changes had been made, he would be unable to run his factory at a profit.

In regard to the inroads made by fleece lined goods, one manufacturer admitted the truth that these are being made extensively, but he believed that there was not a manufacturer in Cohoes who would not change his machinery for that production, if, after the change has been made, there was any show to operate his mill at a profit.

Wages are represented as being higher in Cohoes than elsewhere. The knit goods business has branched out very much in twenty years, many mills having been erected in country places, and their combined production is large. In most of the knitting mills outside of Cohoes, especially in the country, labor is much cheaper than it is in that city, and the result is, that these country manufacturers can undersell the Cohoes mills every time.

The slackness in manufacturing in Cohoes is attributed, by one manufacturer, to the demand in the market for novelties, as well as for fleece lined goods, of a cheap grade, and Cohoes manufacturers are not making many of these. Most of their mills are equipped for making flat goods, for which there is no great demand.

A large knit goods jobber was interviewed, who said that although he would like to sell Cohoes goods altogether, he could not, for the reason that there is not much demand for this class of goods. Where the Cohoes style of goods is wanted, other manufacturers can undersell those of that city, because of the difference in the cost of labor. This jobber says, that, though the country manufacturers can undersell the Cohoes mills on cheap goods, they are not in it when it comes to woolen goods of a good class.

Cohoes, however, is not the only place where this dulness in the knit goods trade exists, as it will be found to some extent at Amsterdam, and other knit goods centres, in and outside of the State. Yet, one will find some mills running in full, and even working over-time, by the side of others, possibly in the same place, that are shut down altogether. This is a peculiar state of affairs, and not easily accounted for in all instances.

Knitting Machinery in Japan.

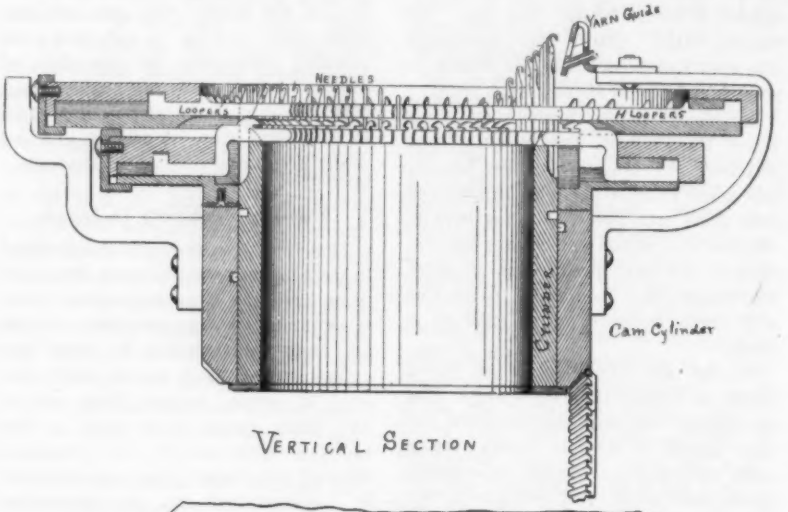
The first knitting machinery used in Japan was brought from England; some has since come from other countries, and the Japanese have copied all, thus deteriorating it. The machines are of hand power, and operated in private houses, from one to five being found in a house. The knitting business is not scattered through the country like weaving, but is concentrated in manufacturing centers, a great deal being done in Osaka.

Large quantities of cheap underwear are made here, all from cotton yarn spun in Japan. Cotton and woolen yarns used in making the better grades are imported. Not much woolen underwear is used, the demand being confined to the better classes of the Japanese people, who also wear light-weight all wool with open meshes in summer. This light weight referred to has been made here for some time for the Indian market. The Japanese children have lately begun wearing mixed knitted singlets in the central part of Japan, and, on account of the comfort derived, they should be extensively used in the northern part of this country. They might be, if furnished at low prices; coarse quality would not hinder their sale.

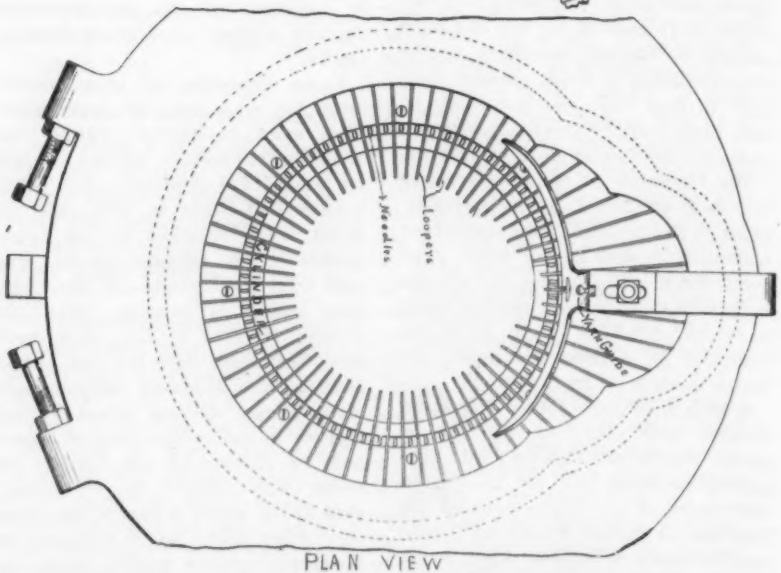
—The wax that is most generally used in sizing is paraffin wax. This is a product from the oil shales that are found in Scotland and other places.

Knitting Machine.

We illustrate a knitting machine, adapted to form loops upon the interior surface of a knitted fabric, thereby increasing the thickness and warmth of it. It is intended more especially for use in manufacturing hosiery, but we understand that it can be used for other fabrics.



VERTICAL SECTION



PLAN VIEW

The loopers in the present machine do not sustain the yarn against the downward pull of the needles, but instead thereof they carry the yarn inward toward the axis of the machine sufficiently to form the loop, and they move radially toward the axis of the machine and are operated by mechanism located outside of the needles, so that they do not obstruct the central space of the machine nor interfere with the proper oversight of the work as it proceeds by the operator. There is also employed means for holding

down the work, consisting of radially-moving holders adapted to engage the top of the work and prevent its rising and thus serve the same purpose as weights. These devices are independent of the loopers and are timed to opperate subsequently to the loopers.

The present illustrations give a plan view of that portion of a knitting machine to which the looping device is applied, and a central, vertical section view thereof. The guide device that is shown, has two openings, or passages, through which the upper and lower yarns go, the former of which is delivered to the loopers to form the loops, and the latter to supply the needles to be knitted into stitches, at the base of the loops in order to secure them. The first yarn is termed the loop thread, and the second the stitch thread. The loopers, we might say, are supported in radial grooves in a stationary ring, and are actuated by a second cam ring.

Latch Needle Knitting Machine.

There has been recently invented in England, by a Nottinghamshire knitter, certain improvements that he has attached to circular latch-needle knitting-machines fitted with horizontally-sliding sinkers, being particularly applicable to fast-running machines of the automatic or semi-automatic seamless type. In these machines the sinkers slide in grooves or tricks outside the needles, are held therein by a cap or cover plate, and are actuated by cams carried by such plate, but the upward pressure on the sinkers of the loops as the needles rise causes the upper edges of the sinkers to wear rapidly and the sinkers thereby are rendered ineffective.

This mechanism has for its object the provision of means whereby the efficiency of the sinkers is maintained.

We furnish three illustrations, from which practical knitters can undoubtedly form a correct idea of the machine. Fig. 1 is a section of Fig. 2, along the line A A, and Fig. 2 is a plan of the needle-cylinder needles, sinkers, sinker ring, thread carrier and connecting parts. Fig. 3 is a section of an alternative form of sinker ring.

The needles have wire shanks and butts and are fitted to slide vertically in tricks or grooves on the outside of the needle-cylinder, and they are actuated for knitting by cams on the cam-ring, and through the post, to

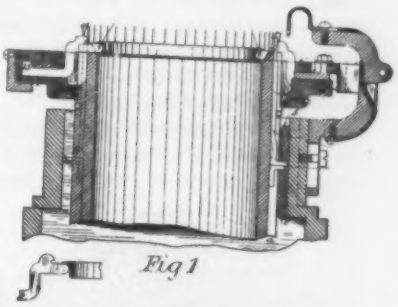


Fig 1

which the thread-carrier is attached, drive the sinker cam-ring through lugs, two lugs being required in order that the relative positions of the knock-over point and sinker-cams may be changed at the end of the reciprocating motions of the knitting-cams as required for knitting the heel and toe of a stocking.

The sinkers are fitted to slide in radial grooves in the sinker-ring, which is fixed to the upper end of the needle-cylinder by screws, and are moved radially in the ring by cams, carried by the cover-ring, which has for the greater part of a circumference a circular groove for the heels of the sinkers. The inside ends of the sinkers also slide in tricks cut in the upper end of the needle-cylinder and are supported thereby during the knocking-over process.

During the process of knitting in the ordinary machine, and supposing the cams to revolve in the direction of the arrow, the needles rise to lift their latches above the loops on the same and to receive the thread for their next loops. The sinkers here move forward to prevent the last-formed loops rising with the needles

and resist the upward pressure of the same. As the needles descend to knock over the old loops the sinkers are drawn back, and a downward pressure is exerted on them; but this pressure is resisted by the upper end of the needle-cylinder. After passing the knocking-over point the needles are again raised and a second upward pressure acts upon the sinkers. These upward pressures, it is claimed, cause the sinkers to wear at the front part of the upper edge, and when worn they are said to become inefficient and fail to hold down the loops on the ascending needles.

In order to maintain the efficiency of the sinkers, the machine here described is provided with a loose

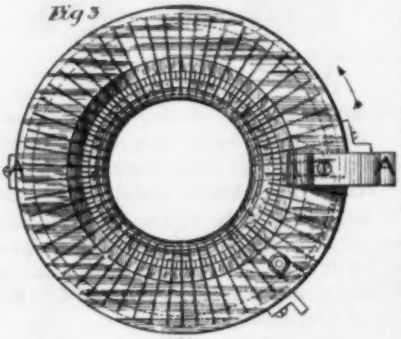


Fig 2

sinker-ring. This ring embraces the ends of the sinkers inside the needle-cylinder and forms a continuous circular surface for the work to pass over, the pull or weight of which tends to prevent the ring rising, and this, combined with the fact that the ring is held in position by all the sinkers not actually engaged in the formation of the loops, reacts upon the sinkers adjacent to the rising needles, and prevents the upward pressure of the loops on the rising needles being transmitted outside the needle-cylinder, whereby the wear of the sinkers is obviated and their efficiency maintained.

The groove in the ring is of such a size and shape that the ends of the sinkers are an easy fit therein, and the diameter of the ring at the inside of the groove is of such a size that the sinkers when in their most forward position touch the inside of the groove, whereby a slow rotating movement of the ring around its center is obtained, and its position of contact with the sinkers is continually changing.

Machine for Striped Knitted Fabrics.

Philip Hoffman, of Philadelphia, recently invented a machine for producing striped knitted fabrics, having transverse stripes, formed by striping-yarn interposed upon the main knitting yarn.

In producing a fabric of this kind, an ordinary circular-knitting machine having a guide which continually feeds to the needles of the machine one or more strands of knitting-yarn to produce a continuous tubular web of knitted fabric, and in connection with this main guide is employed one or more supplementary and adjustable guides carrying extra yarns, either of which may, by proper adjustment, be caused to feed its yarn to the needles along with the strand from the main guide and in such relation to the latter that the supplementary yarn will always appear upon the face of the fabric. Hence when the supplementary yarn guide is out of action the fabric will be produced from the strand delivered by the main yarn-guard; but when the supplementary guide is thrown into operation the stitches produced by the main knitting-yarn will be overlaid by the supplementary yarn, which will appear upon the face of the fabric and will thus produce a stripe extending throughout as many courses as may be knitted while the supplementary yarn-guide is in action.

—In the revolving flat card the cylinder carries the cotton which it has taken from the licker-in, and dashes it immediately into the teeth of the flats, so that they are at once loaded with cotton.

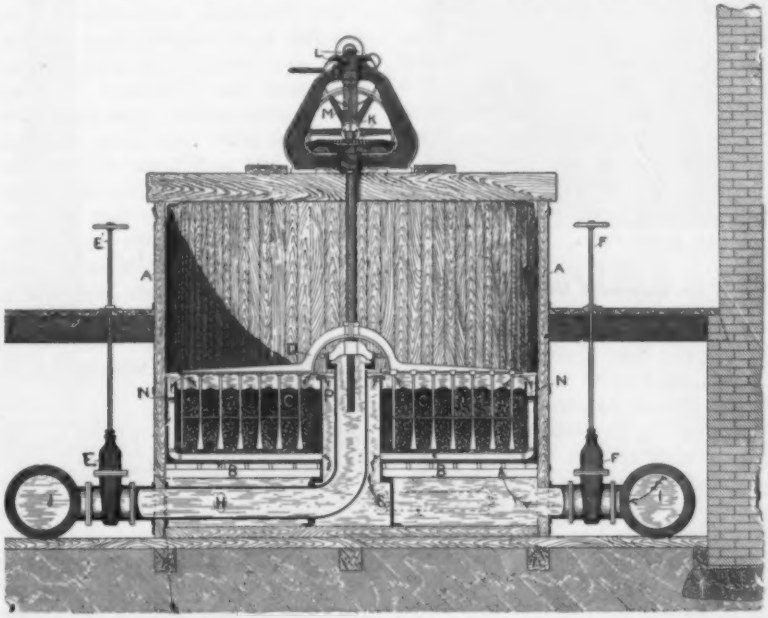
—Indian cotton spinners complain that last year was a very trying one.

POWER DEPARTMENT

ELECTRICITY—STEAM—WATER.

Pure Water for Textile Mills.

In our last two issues, we showed two types of filters, made by the New York Filter Manufacturing Company, New York, that are worthy of the attention of every textile manufacturer, who depends for excellence of production upon a pure supply of water. In the previous articles, we described and illustrated the Jewell and New York types of gravity filters. At this time we call attention to the Warren type of filter, such as is being used in the plant of the Lowell Bleachery and Dye Works, Lowell, Mass.



WARREN FILTER.

This company have heretofore taken their water from a canal leading from the Concord River, and have had to contend with the drainage and washings from the roads and fields, and at all times a dark stain in the water, coming from the leaves and grass in the swamps. Their filter plant has a guaranteed capacity of 3000 gallons per minute.

It consists of a large coagulating or settling basin; 10-13 foot filters, 10 feet high; and a storage tank 14 feet in diameter. The water flows to the filter plant through a 30-inch pipe, reduced to 20 inches near the settling basin, and is controlled as it enters the settling basin by a butterfly valve governed by a copper float. The water flowing into the basin is treated with a weak solution of alum, and in its passage through the basin, which holds about 60,000 gallons, much of the heavier dirt and mud is deposited by sedimentation. From there the water flows to the filters, percolating through 28 inches of fine, ground quartz, and then flows to the storage tank. From the storage tank it is pumped to the bleachery and dye

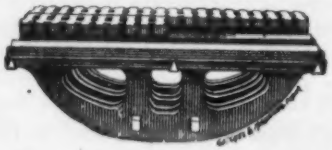
works, where it is used in the various processes known to that business. The water as it comes from the filters is as pure and bright as the very best spring water, and enables the bleaching and dyeing to be carried on with great economy and most uniform results. When the filters become foul from accumulated matter from the water, the agitating machinery, which consists of a heavy rake, driven by gearing, is lowered into the quartz, where it slowly revolves. At the same time the filtered water from the other filters in use flows up through the bed, the combined scouring and washing sufficing to carry off all accumulated impurities, rendering the quartz clean and ready for use once more. This process requires from eight to ten minutes per filter, and once in the day is sufficient. The plant requires very little attention. The alum solution is mixed in tanks which contain several hours' supply, and after once being cleaned, the filters will run throughout the day without any more care.

An Improved Grate Bar.

The Earl & Wilson improved sectional grate bar, illustrated herewith, was patented by W. Morris Earl, who is a moulder of 30 years' experience in cast iron. It is made in two parts, bearer bars or ribs which are permanent, constituting one-half of the weight in the small, and three-fifths of the weight in the large grates; and top sections which rest on the shoulders of the ribs by means of two horizontal bars into which five transverse bars are cast. These sections are six, eight, ten or twelve inches square, less expansion space allowed, as may be desired.

Advantages over any other grate on the market are claimed for it in four important and essential points. First, saving in fuel of 10 to 25 per cent.; second, in repairs, 80 per cent.; third, time in repairing over 100 per cent.; fourth, increased draft, 25 per cent.

Owing to the construction of this grate bar, it is impossible for it to warp or cup, as the iron is heated the same throughout its different parts and allowed to expand and contract without resistance, and consequently remains in its original shape. Heat can not vary in the space of one section, as an expansion space of three-eighths of an inch is left between each row of sections, hence there is no warping or cupping as in all other grates.



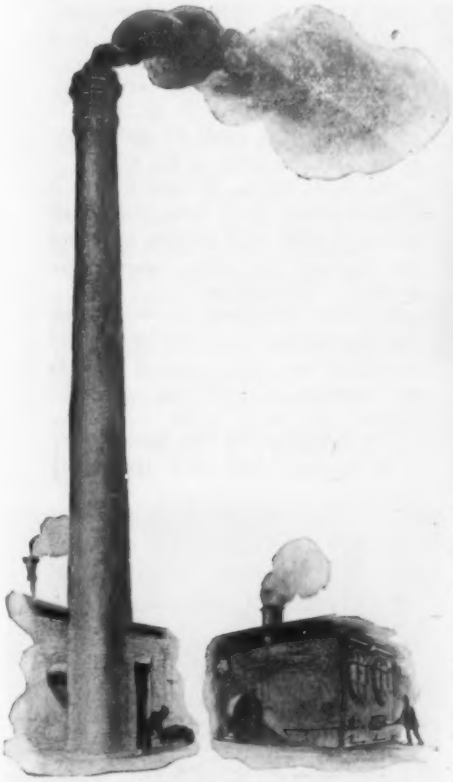
Our Southern representative has recently spent several days in Gastonia and vicinity and held personal interviews with a number of prominent manufacturers who have been using this grate from three to twelve months, and he informs us that each one of them speaks highly of it as being all and even more than the owners claim for it. We recommend steam users who wish to save money and annoyance in this direction to correspond with the Earl & Wilson Co., Gastonia, N. C., who will be pleased to give any information desired.

The Fan versus the Chimney as a Means of Draft Production.

The condition of mind of the engineering public at the present time appears to be such that any description of the relative merits of the fan and the chimney is welcome. The accompanying illustration must therefore possess a special interest for many. It illustrates in a most forcible manner the relation between the size of a chimney and the size of a fan required for the same boiler capacity. Being drawn to the same scale, the relation is rendered clearly evident, and the permanence of the chimney as compared with the portability of the fan is likewise emphasized.

Everyone realizes that good draft is

essential to success with any boiler plant, and the growing application of the fan as a means of draft production is the best evidence that it most completely fulfils the requirements where intense draft and perfect regulation are desired.



It is a recognized fact that the low grade fuels, which are always very fine in their character, require a very strong draft, a draft in fact stronger than can be obtained with the ordinary chimney of 100 or so feet in height.

The fan is applied either as an independent means of draft production or as an auxiliary to a chimney, and may be applied either to force air into the ash pits, or to exhaust the gases from the furnaces.

The forced draft fan and stack seldom exceeds 20 per cent., and a complete duplex induced draft apparatus may be installed for about 40 per cent. of the cost of a chimney of the same capacity. Of course, an opportunity is provided for the utilization of the waste heat which is necessary for the production of draft in the case of a chimney.

A typical forced draft plant is shown in the small engraving, the fan being arranged to discharge downward beneath the floor, and through a hollow bridge wall, whence it is admitted to the ash pits.

A plant arranged upon this general principle installed at the Hotel Iro-

quois, Buffalo, N. Y., showed an annual fuel cost of $7680.93 as against $10,151.30 for the year preceding, when the chimney draft was used. This saving was brought about by the reduction in the cost of the fuel per ton, as a low grade fuel was employed, a little more in weight being burned with the fan than with the chimney, but far less in cost.

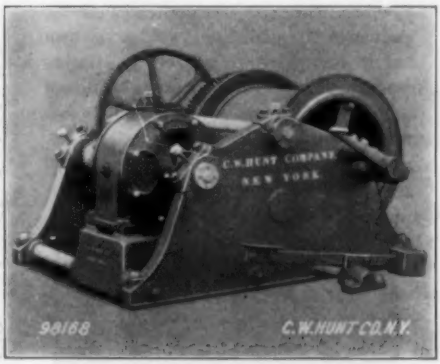
Mechanical draft naturally lends itself to application in connection with stokers of various types, producing the intensity of draft, and being susceptible to the regulation, which is desirable with stoker firing. It is also applicable in connection with economizers or air heaters.

Some special features of this subject are presented in a novel publication known as Bulletin J., just issued by the B. F. Sturtevant Co., of Boston, Mass., by whose courtesy the above is presented.

—Soaps and soap preparations enter largely into size mixings, and they are undoubtedly good softening agents.

An Electric Hoisting Engine.

The accompanying illustrations show one of the many sizes of the Hunt Electric Hoisting Engine which is designed from start to finish to be an electric hoisting engine, and is not

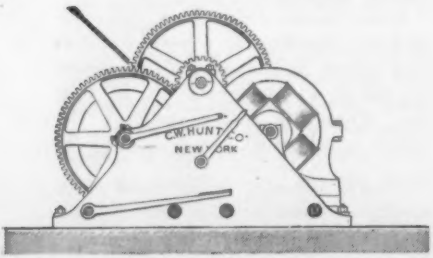


ELECTRIC HOISTING ENGINE—SIDE VIEW.

a modified steam hoist with an electric motor attached. These machines are built suitable for high, moderate, and low hoisting speeds, and properly proportioned for any load and speed desired.

The bearings are supported by, and are solid with the heavy side frames. Each bearing is bushed with a replacable phosphor-bronze bushing which can be readily replaced, as they are all made on the interchangeable system.

At the one setting, the side frames are faced and bored for the bearings and the distance bars, insuring absolute alignment. The machine throughout is built to templets, and in no way is the work dependent upon the workmen's measurements.



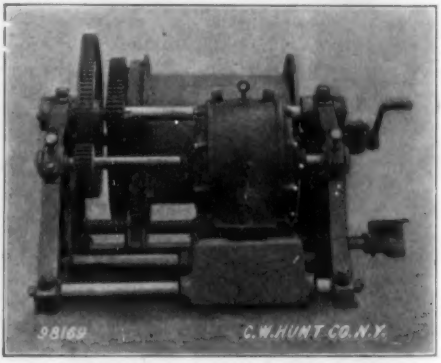
As seen by the illustration, the armature shaft runs in bearings on the main frame in such a manner that the pinion is not overhung, but is supported by the bearings, making a very stiff and smooth running machine.

In the construction, the armature is located by its shaft in the bearings, after which the fields are adjusted accurately to the armature and then fastened rigidly to the distance bars of the machine. For this reason, the machine, when received, is ready to go to work, and needs no setting up, in the ordinary sense of the word.

The hoist shown, is operated by a friction clutch which is so constructed that no strains exist, tending to spread the frames. In other words, the device is self-contained.

A differential brake is used, assisting the engineer in its application and requiring very little physical force in its operation to hold and lower the load.

The oiling devices are exceptionally good, having been very thoroughly



ELECTRIC HOISTING ENGINE—END VIEW.

worked out. Each bearing has an oil reservoir of its own. The machine is entirely self-contained and is shipped in one piece.

—We learn that Prof. R. C. Carpenter, Sibley College, Cornell University, is now engaged in making a series of exhaustive tests with Cling-Surface. A preliminary report just made shows most surprising results as to the in-

crease of transmitting power of belts from its use. A full report with diagram of curves, will be shown in our May issue.

Direct Connected vs. Belted Dynamos.

ALTON D ADAMS.

The extended use of dynamos for light and power purposes in factories and large buildings, renders their best mode of driving of general interest.

Time was, but a few years since, when direct driving for private plants was almost unheard of, and nearly all of the electric installations more than five years old in shops and office buildings have belt driven dynamos.

During several years just past, the direct driven dynamo has gained in favor for isolated plants, but a large part of the mill work is still done with the belt connected type.

In central stations conditions vary somewhat from those in isolated plants, and are best considered separately.

For isolated plants the direct connected dynamo usually presents the following advantages over the belted type: the floor space occupied by the engine and dynamo is reduced, the noise from quick moving armature and belts is absent; the oiling devices on dynamo require slightly less care while in operation, and the wearing parts of the dynamo have somewhat longer life.

In favor of the belted dynamo are the following: its first cost is less; the construction is simpler, there being fewer poles, coils, brushes, commutator segments and small parts.

The parts of the belt-driven dynamo are usually of a form more readily handled by the ordinary machine shop tools, so that repairs can be more cheaply and quickly made, and local men are more apt to be able to repair the windings.

In the matters of efficiency, depreciation and reliability there is little to choose between belted and direct connected dynamos in medium and large sizes, but in quite small machines—say under 25,000 watts capacity—the belted machines would usually be slightly more efficient.

Having the several advantages of each type clearly in mind, it is in most cases easy to select a machine best adapted for the location and work.

In the high class office building space is of high value, and the architect invades heaven and earth to provide it; in such a case the extra room required by belted over direct-connected dynamos might be rented for enough yearly to pay a very high rate of interest on their difference on first cost, and noise of operation must be obviated as far as possible.

The considerations just named have rightfully led to the very general use of direct-connected in first class office buildings.

Again, in the case of a large factory where it is desired to increase the electric equipment and the power-plant space is too much limited by other conditions to permit the use of belted dynamos, the direct-connected machines may be the cheapest and best way to solve the problem.

In a factory where a large amount of electric power for driving motors or other purposes is to be used constantly, the best equipment will be one or more larger units, and as large units tend to stand speed of revolution, it may well be in this case that the somewhat greater cost of direct-connected machines will be more than offset by their advantages.

In the ordinary case of the electric plant of medium size required in a factory, warehouse, or other building where space is of only moderate value, and where the extra room required by belts would often remain idle, there is little reason to discard the belted dynamo.

The direct-driven dynamo being more expensive, the manufacturer naturally prefers to sell it rather than a belted one of the same capacity.

It is not uncommon for salesmen to refer to direct-connected dynamos as possessed of great inherent though mysterous advantages, and some purchasers seem to think that the higher

price of direct-connected electrical machinery must imply more desirable working qualities.

In spite of all the contrary factions, however, belt-driven dynamos at speeds which imply the highest output and efficiency for a given weight of material consistent with good design, will continue, as in the past, to do a large part of electric work.

Some Things Engineers Should Know.

What is the most important fitting on a steam boiler?

To construct a steam boiler, the first and most important thing to know is the maximum working pressure per square inch that is to be carried, as from this, and the power which the boiler is to develop—is calculated the proportions which the various parts will have to each other, as thickness of plate, kind of joint, diameter and pitch of rivets, diameter and length of the boiler and diameter and number of braces. Such being the case, is not the safety-valve the fitting on a steam boiler which is of first and prime importance, and the one which should receive the closest attention from those in charge.

When a boiler has a safety-valve large enough to carry off all the steam the boiler will generate, all other outlets being closed, and the valve is in good working order, and set to blow at a pressure which is not beyond the maximum, as calculated from the construction of the parts, and also taking into consideration the general condition of the boiler, the danger attending the generation of steam under pressure, is to a great extent obviated.

It should be a fixed rule with all who have the care of boilers, to have the safety-valves eased-up daily, when the pressure on the boiler is near that at which the valves are set to blow. As then the working of the valve can be better judged than when much power has to be exerted to raise the valve off its seat, the pressure on the boiler being say, twenty or thirty pounds below the point of blowing-off.

The above applied more directly to high-pressure boilers, but it is equally important that the safety valves on low-pressure heating boilers should be lifted daily, as in many instances these boilers do not receive continuous attention, as do the high-pressure ones.

If the upper valve on a water glass is shut in, what effect will this have if the water stood at two gauges before the valve is shut?

If there is no pressure—above the atmospheric pressure—on the surface of the water in the boiler the height of water in the glass will remain unchanged.

If there is a partial vacuum in the steam space—which results from the steam pressure being allowed to go down after a boiler has been in use and all outlets closed tight—and the upper valve on the water glass closed, a very slight leakage of air around the upper end of the glass or valve stem, will cause bubbles of air to pass down through the water in the glass into the boiler.

If there is a pressure of steam on the surface of the water in the boiler, above the atmospheric pressure, and the upper valve on the water glass is closed, the water will be forced up to the top of the glass filling the space completely, the steam being condensed and the internal pressure being on the surface of the water.

If a boiler is filled with water until the second guage is reached, and all outlets by which the air could escape are closed, during the filling, there will be a pressure of air on the surface of the water. Then, if the upper valve on the water glass is shut, and the upper valve stem and packing are perfectly tight, the water will remain at the same level, the pressure of air remaining equal. Under these conditions, if steam is generated, the water in the glass will be gradually forced up to the top of the glass. The pressure in the boiler, rising and forcing the water up, compresses the air in the upper part of the water glass into a smaller space.

DYEING DEPARTMENT.

Dye Recipes for April.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 36 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 49.

Pink on Woolen Yarn.

Fast Acid Eosine G on 100 pounds worsted yarn.

Prepare dye bath with

1 lb. Fast Acid Eosine G.
(Victor Koechl & Co., 122 Hudson St., New York.)
10 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter yarn at 170-180 deg., bring to a boil, and dye at a boiling temperature for one hour, turning frequently.

The bath should always have an acid reaction, as the beauty of the shade is infavorably influenced if too little acid is used.

Fast Acid Eosine G has excellent equalizing power. It produces a pink, which is as pure as that of Eosine, but much faster to light, and easier of application. This color also has great fastness to stoving.

RECIPE NO. 50.

Medium Blue on Mixed Cloth.

Eboli Blue B on 100 pounds of cotton and wool mixed cloth.

Prepare dye bath with

2½ lbs. Eboli Blue B, Patd.
(C. Bischoff & Co., 87 Park Place, New York.)
20 lbs. Common Salt.

Enter cloth at boil, run 1½ hours at that heat, shut off steam, and run ½ hour without steam.

Eboli Blue B, Patd., dyes wool and cotton alike in shade, in one bath. The color will not rub, and it works on the fibre level, giving a fast shade of blue. (See recipe 55, this issue.)

RECIPE NO. 51.

Red on Worsted Yarn.

Bordeaux B on 100 pounds wool yarn.

Prepare dye bath with

2½ lbs. Bordeaux B.
(A. Klipstein & Co., 122 Pearl St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 130 degrees, bring to boil while turning, and turn to shade at that heat.

Bordeaux B gives an excellent shade of a bright and bloomy color of dark red, which is fast and well adapted for carpet and other yarns, also for piece goods.

RECIPE NO. 52.

Dark Blue on Worsted

Martial Black B on 100 pounds worsted yarn.

Prepare dye bath with

20 lbs. Martial Black B.
(Sykes & Street, 85 Water St., New York.)
2½ lbs. Oxalic Acid.
2½ lbs. Muriatic Acid.

Enter yarn at boil, and turn 2½ hours at that heat. Rinse.

This brand of black dye will be found to work on yarn, raw stock, or piece goods, very satisfactorily. It is fast and does not rub off, and dyes of itself a fine bluish and rich shade of black. (See recipe 58, this issue).

RECIPE NO. 53.

Medium Blue on Worsted Yarn.

Alizarine Blue S A P on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs. Alizarine Blue S A P.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 140 degrees, bring to

boil while turning, and turn to shade at that heat.

With a three per cent. dyeing, Alizarine Blue S A P gives a full and bright shade of blue. This dye works very level on the fibre, both for light and dark shades. It readily dissolves, and does not rub off. (See recipe 41 for a light shade.)

RECIPE NO. 54.

Dark Blue Black on Worsted.

Logwood Liquor for Wool on 100 pounds wool yarn.

Prepare dye bath with

6 lbs. Logwood Liquor for Wool.
(Stamford Mfg. Co., 133 Front St., New York.)
2 lbs. Blue Vitriol.
2 lbs. Copperas.
2 lbs. Oxalic Acid.
¼ lb. Acid Violet 5 B.
(John J. Keller & Co., 104 Murray St., New York.)

Enter yarn at boil, and turn 1½ hours at that heat.

The above combination dyes a clean and full shade in one dip. It will be found as fast as though the yarn was mordanted and afterwards dyed. Of course, the pureness and strength of the Logwood Liquor for Wool is the principal thing. (See recipe 12, 27 and 38 for colors from Logwood Liquor for Wool, used alone; and recipe 44 for a black from a combination with Fustic Liquor M.)

RECIPE NO. 55.

Blue on Mixed Cloth.

Eboli Blue B, Patd., on 100 pounds of mixed cotton and wool cloth.

Prepare dye bath with

5 lbs. Eboli Blue B, Patd.
(C. Bischoff & Co., 87 Park Place, New York.)
25 lbs. Common Salt.

Enter yarn at boil, run 1½ hours at that heat; shut off steam, and run ½ hour with steam turned on.

Finish.

Eboli Blue B, Patd., as shown here, is well adapted for dyeing both light and dark shades of blue in one dip, on cotton and wool mixed goods. It is well adapted for suitings, cloakings, and flannels, containing a mixture of cotton and wool, as it covers both the fibres equally the same. (See recipe 50, this issue).

RECIPE NO. 56.

Medium Blue on Cotton Yarn.

Columbia Blue G on 100 pounds cotton yarn.

Prepare dye bath with

2½ lbs. Columbia Blue G.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
20 lbs. Common Salt.
¼ lb. Sal Soda.

Enter yarn at boil, and turn one hour at that heat.

Columbia Blue G dyes a full shade of blue, with 2½ per cent. of color, and, like other Columbia dyes, it works slowly and evenly on the fibre. It will combine with other direct dyes for producing various shades.

RECIPE NO. 57.

Red on Worsted Yarn.

Fast Red on 100 pounds wool yarn.

Prepare dye bath with

2½ lbs. Fast Red.
(A. Klipstein & Co., 122 Pearl St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 120 degrees, bring to boil while turning, and turn to shade at that heat.

Fast Red dyes a very fine and brilliant shade of red, the color going on the fibre slowly, which results in level shades. Fast Red is also valuable for combining with other acid dyes and extracts.

RECIPE NO. 58.

Slate on Worsted Yarn.

Martial Black B on 100 pounds worsted yarn.

Prepare dye bath with

3½ lbs. Martial Black B.
(Sykes & Street, 85 Water St., New York.)
1½ lbs. Oxalic Acid.
1½ lbs. Muriatic Acid.

Enter yarn at 160 degrees, bring to boil while turning, and turn for two hours at that heat.

Rinse.

Martial Black B, when dyed with small amounts of color, will produce fine shades of grays and slates, which are fast, and comparatively inexpen-

sive, on account of its being a one-dip dye. By working on the fibre slowly and level, it will be found of great value in the dye house. (See recipe 52, this issue).

RECIPE NO. 59.

Magenta on Worsted Yarn.

Acid Magenta on 100 pounds wool yarn.

Prepare dye bath with

2 lbs. Acid Magenta No. 39.
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 160°, bring to boil while turning, and turn to shade at that heat.

Most every dyer uses Acid Magenta more or less, as it is very desirable for combining with other acid dyes, on account of its going on to the fibre so slowly, and working so level. Acid Magenta, as the above dyeing shows, is a very strong and pure color.

RECIPE NO. 60.

Reddish Brown on Cotton Yarn.

Diamine Brown M on 100 pounds cotton yarn.

Prepare dye bath with

3 lbs. Diamine Brown M.
(Wm. J. Matheson & Co., 152 Front St., New York.)
20 lbs. Common Salt.
2 lbs. Soda.

Enter yarn at boil, and turn one hour at that heat.

Diamine Brown M produces a brown of a reddish shade, and can be combined with other diamine colors in making a variety of shades. (See recipe 3, in the January issue, of a brown from Diamine Brown B).

RECIPE NO. 61.

Greenish Blue on Worsted.

Erioglaucine on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs. Erioglaucine.
(John J. Keller & Co., 104 Murray St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 140 degrees, bring to boil while turning, and turn to shade at that heat.

A full greenish shade of blue is shown here, which is very fast. This dye is noted for its level dyeing, and is largely used in combining with other acid dyes for producing various shades. (See recipe 33, for a light blue.)

RECIPE NO. 62.

Red on Worsted Yarn.

Claret Red on 100 pounds worsted yarn.

Prepare dye bath with

2 lbs. Claret Red.
(Anchor Color Mfg. Co., 462 Cherry St., New York.)
4 lbs Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter yarn at 120 degrees, bring to boil while turning, and turn to shade at that heat.

Claret Red is very soluble in hot water, and will be found a very useful color, not only in itself, but for combining with other acid dyes for shading. It produces very fine bloomy and even shades.

RECIPE NO. 63.

Dark Blue on Worsted Yarn.

Chrome Blue on 100 pounds worsted yarn.

Mordant for two hours at boil with

3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Rinse, and dye in separate bath with

2 lbs. Chrome Blue.
(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)
5 lbs. Acetic Acid.

Enter yarn at 130 degrees, bring to boil while turning, and turn to shade. This dye will be found excellent for worsted cloth, cloakings and suitings, on account of its fastness and brilliant shade. (See recipe 32, in February issue, for a darker shade of blue).

RECIPE NO. 64.

Green on Worsted Yarn.

The Amend Mordanting Process on 100 lbs. of Worsted Yarn (controlled by The Amend Process Co. 205-211 Third Ave., N. Y.). Prepare bath for mordanting with

6 lbs. of Acetic Acid (30 per cent).

Turn one-half hour at 140° F. Lift yarn and add.

1 lb. of Chromic Acid (previously dissolved in water). Turn for one-half hour, allowing temperature to fall.

Then lift and add to bath

6 lbs. of Bi Sulphite of Soda.

Bring bath to 140° F. and turn for one-half hour at this temperature.

Wring or pass through hydro-extractor, and dye in a bath of

10 lbs. Alizarine Green S No. 4.
(Farbenfabriken of Elberfeld Co.)
½ lb. of 20% Ammonia.

Enter goods at ordinary temperature, gradually raising same to boiling, and finish the dyeing at this temperature.

The advantages of "Amend Mordanting Process" over the old method of mordanting with bichromate of potash and tartar or lactic acid are:

(1) But little heat is required, hence a great saving in steam.

(2) The process is shorter.

(3) The mordanted yarn is left in a better condition, since the boiling temperature of the older mordanting process is avoided.

(4) There is a saving in the dye stuff, i. e., the same depth of shade with a greater brilliancy can be produced with a lower percentage of dyestuff.

(5) The dyed goods are less liable to unevenness by this process than the old.

New Dyes.

We think that dyers will be much interested in the colors represented in our Dyers' Supplement of this month, in which we give certain new recipes that will be appreciated.

In recipe 49, we show a pink on woolen yarn, obtained from Fast Acid Eosine G, obtained from Victor Koechl & Co., New York. This dye is an acid one, of very excellent equalizing properties, producing a yellowish pink shade, which is as pure as that produced by Eosine, but much faster to light, and more easily applicable. Colors dyed with it will withstand milling in water, and do not bleed, but it does not stand milling in strong alkaline soap, nor washing in strong soap and soda solutions.

The effect of Eboli Blue B, furnished by C. Bischoff & Co., New York, is noticed in Recipe No. 50, for a medium blue on mixed cloth. We show an excellent result, as may be also observed in recipe 55. We direct the attention of dyers to the comments made by our dyer.

A shade of worsted yarn, in recipe 51, from Bordeaux B, furnished by A. Klipstein & Co., New York, possesses, as will be observed, points of merit that we especially direct attention to.

Martial Black B, furnished by Sykes & Street, New York, appears in recipe 52, for the production of a dark blue on worsted yarn, that calls for more than passing notice, for an excellent shade of blue on wool that is fast to light, air, acid and fulling. This dye possesses many exceptional advantages, as ease of application, and while it is difficult to provide an arbitrary process for dyeing all kinds of wool, the recipe that we give should serve as a valuable guide in obtaining satisfactory results. The quantity of this dye required to produce a full shade, is, of course, dependent upon the material to be dyed. The shades that are produced are absolutely even, and entirely free from crock, unless an excess of black is used. The dye comes in a paste form, and is intended for dyeing all classes of woolen fabrics and fibres. It is already largely used in Great Britain and on the Continent. We furnish two recipes in this number, in which Martial Black B is used, the other being No. 58.

The New York & Boston Dyewood Company, New York, have their Columbia Blue G, shown to good effect in recipe 56, for the production of a medium blue on cotton yarn. This dye, as well as Columbia Blue R, also furnished by this house, are substantive colors, used in the usual manner,

and were intended to take the place of Benzoazurines, being, when brought out, equally fast to washing, acid and light, with the advantage of not being changed by alkali, hot drying, or hot calendering.

In recipe No. 60, a reddish brown on cotton is given, obtained from the use of Diamine Brown M, obtained from Wm. J. Matheson & Co., New York. The excellent qualities of this dye are its solubility, as it dissolves very easily and completely; shade and method of dyeing. This dye goes on to the fibre very level, and baths are almost completely exhausted when light shades are colored. Colors obtained from this dye are well known for their fastness to washing and to light.

The Use of Basic Dyes in the Madder Style.

Some of the basic coal-tar coloring matters are largely used in printing, especially for the production of dark blue, olive, and bright green shades. The goods are first printed with the pattern, or combinations of patterns, in various mordants, according to the shade desired, chocolate or pure alumina mordants being chiefly used. After the pieces have been aged, dunged, and prepared for dyeing, they are dyed with an astringent, such as sumach or myrabolams (either alone or mixed with other dyewoods or adjective coloring matters), whereby the metallic mordant on the cloth is converted into a compound containing tannic acid and capable of combining with the basic coloring matter.

The tannin material, and the other coloring matter used along with it, are chosen so as to yield shades of such a character that, when afterwards dyed with the basic color, the shade desired is produced. The shade is thus influenced by the nature of the mordant on the cloth, the materials used in the first dyeing, and by the coloring matters applied in the last process of dyeing.

For dark green and olive shades, the goods are printed either in an iron or a chocolate mordant; the larger the proportion of iron, the darker or blacker is the shade obtained, alumina tending to render the shade brighter and yellower in tone. Bright green shades are usually dyed upon a pure alumina mordant; dark indigo blues upon chocolate mordants of various strengths. For the first dyeing, a mixture of sumach and prepared bark is generally employed for the green, olive, and dark olive shades, which produce blackish-olive shades on chocolate mordants, and yellow shades on the alumina-prepared cloth.

For dark indigo blues, the first dyeing is done either with sumach or myrabolams upon chocolate mordants. After the goods have been dyed in these astringent mixtures, they are washed in hot water, and are then ready for the second dyeing. Unfortunately there are very few of the basic colors that can be used in this process, owing to the fact that most of them stain the unprinted parts of the cloth, so that it is impossible to obtain pure whites in the prints. In fact, it is only what may be considered the more fugitive colors of this class, like brilliant green, methyl violet, and the colors belonging to the rosaniline group of colors, that can be used, most of the fast colors being unsuitable. With most of the fast colors it is impossible to clear the whites by chemicing when stained to the degree which always occurs in dyeing with them. On this account, the selection of coloring matters for the second dyeing operation is very limited, the following colors being those chiefly used, viz.,methyl violet, blue and red shade; magenta crystals; brilliant green, and, occasionally, methylene green G. G.

The pieces, after dyeing with the artificial coal-tar colors, have the color lake in the form of a compound, containing iron or alumina with tannic acid and the color base; this color base is only fairly fast to washing and the action of light. In order to render the shades faster, the goods are treated with tartar emetic, the lat-

ter being added to the dye-beck immediately after the pieces have been treated in the beck for the required time to complete the process of dyeing. The goods are washed as they are withdrawn from the dyeing liquor, soaped, and then chemiced until the white parts are sufficiently cleared. [Printing of Textile Fabrics.]

Fixation of Chromium on the Cotton Fibre.

A recent French patent covers, says the Textile Recorder, Manchester, the following method of mordanting cotton yarn: 100 lbs. of varn are steeped in lime water, wrung, washed, and boiled for two hours with 12 lbs. of fluorchrome. The hydrate of lime in the fibre may also previously be converted into carbonate by exposure to the atomsphere. A still better fixation is achieved if, before steeping in lime water, the cotton be prepared with 10 per cent. of tannic acid, or with an equivalent of a tanniferous material such as sumach; the chromium bath in that case may be exhausted quantitatively.

Another process suggested by Lallement, is divided in three stages. In the first stage the cotton is worked in a solution of neutral chromate, such as results by dissolving together in 1 litre of water 40 grams of bichromate of soda, and 80 to 90 grams of crystal soda. In the second stage provisional fixation is effected by entering the hydro-extracted yarn into a bath containing 20 to 25 grams of chrome alum per litre, and working at 60° C. temperature until the brown color is well developed. Reduction into the green oxide forms the last step, and is effected by working the yarn for some time in a boiling bath containing per litre 50cc. of hydrosulphite of soda of 23° Be. and kept distinctly alkaline with caustic soda. The yarn, again washed, is then ready for dyeing. These figures, however, only hold good for light shades; for darker colors the entire process may be repeated, or the concentration of the chromate and the chromium bath must be suitably increased, whilst that of the reducing bath may remain unchanged. In any case the baths may be kept on and freshened up as required. Finally, the hydrosulphite may be omitted altogether, as 15 minutes boiling in a 1/10th per cent. solution of carbonate of soda effects an equally satisfactory fixation.

Mercerizing Machine.

In our list of mercerizing apparatuses for treating cotton yarns, etc., given in our February issue, we inadvertently omitted a patent that was issued to Arthur Birch, of Arlington, Mass., under date of October 11, 1898. This apparatus was patented especially for use in treating yarns in the skein or hank form. The object of the apparatus, of course, is the prevention of the shrinkage of yarn when subjected to the process of mercerization. This object is accomplished by providing means for holding the yarn under strong tension, or strain, while undergoing the action of the mercerizing solution.

—The purification of petroleum-naptha with caustic soda leads to certain by-products of a soapy character, from which, by decomposition with mineral acid, may be liberated an oily substance of strongly pronounced acidity. This substance, if treated in the usual manner with sulphuric acid, and finally neutralized with ammonia, yields a product very similar to that obtained from castor oil, and which has been proved an excellent substitute for the ordinary Turkey-red oil, both in the production of alizarine-red and of para-red.

—"Red-blind" people cannot of course distinguish between red and green, and it is remarkable that even in the normal eye there is a certain portion of the retina which is color blind to red.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

The Asclepias Fibre.

Editor Textile World:

Last year, I found in the mountains of North Carolina a plant, the name of which I do not know, but which seemed to me as belonging to the thistle family. I am desirous to know whether the lint of this plant, sample of which I send you, is suitable for manufacturing, and also what the name of the plant is.

South Carolina. F. M.

We think that the sample which our correspondent has sent to us belongs to the genus Asclepias, which embraces the common milk-weed or silk-weed, of the United States. We can hardly tell from the specimen that was sent to us, the exact species of the genus to which it belongs. There are a number of species of the Asclepias. We think, however, that the sample sent to us is the common swamp milk-weed, which is found to some extent in the Carolinas, on the Atlantic coast. The fibre is of no use whatever for spinning into yarn, and, therefore, useless as a textile fibre. It is sometimes used for stuffing mattresses.

Elastic Webs.

Editor Textile World:

Will you kindly give me the address of the nearest manufacturer of elastic webs from whom I can buy suspender webbing? I want to get it as near home as possible.

North Carolina. Martin.

The Magnolia Webbing Co., of Charlotte, N. C., is probably the nearest manufacturer to you, and we would suggest that you correspond with them. There are numerous others in Philadelphia, New York and New England, whose addresses you will find in the Textile World's Directory.

Instruction in Chemistry.

Editor Textile World:

Do you know of a school where instruction in chemistry, as applied to cotton dyeing, is taught?

Kentucky. L. R.

Instruction on this subject is given at the Textile School, cor. Broad & Pine Sts., Philadelphia, E. W. France, Director, and at the Lowell Textile School, Lowell, Mass., William W. Crusby, director.

Gun Cotton.

Editor Textile World:

Will you kindly furnish me with information regarding the manufacture of gun cotton? We are anxious to learn how this article is produced, and what the ingredients are.

Massachusetts. F. B. G.

Gun cotton belongs to a class of preparations, the basis of which is cellulose, acted upon by nitric acid, either taken singly, or admixed with a strong sulphuric acid, or is developed by the action of sulphuric acid upon a nitrate. Gun cotton, as prepared for the English government, is made from a mixture of 55 parts of nitric acid, and 165 parts of sulphuric acid, applied to one part of cotton. The nitrating mixture is placed in cast-iron vessels, cooled from without by flowing water, and the cotton immersed. It may either remain in these until ready for washing, or may, after a brief immersion, be transferred to smaller stone-ware vessels, similarly cooled, in which it then remains for twenty-four hours, for the double purpose of completing the nitration, so that the product shall contain a maximum of the highest, or hexanitrate, and of allowing the contents of the jar to cool down perfectly. The nitrated cotton is then centrifugated, stirred up thoroughly with cold water, again centrifugated, and then washed systematically with warm water to which some soda has been added. The gun cotton so obtained may either be used in the loose form, or, when designed for manufacture into cartridges, is beaten in a hollander after the manner of paper-pulp, and then washed and pressed in the desired forms. The gun cotton, when finished, is usually preserved in a moist state, and dried only when needed for use. It, however, does not require to be sharply dried, as with fifteen to twenty per cent. of moisture it can be made to develop its full explosive powers.

Cleaning Waste Cotton.

Editor Textile World:

In your March issue we noted an inquiry headed "Cotton Picker Wanted." Your correspondent wished to get a machine that would clean the dirt and trash out of poor cotton, sample cotton and sweepings. What this man wants is a burr picker. We have furnished machines for this very purpose and they work successfully.

Newark, N. J. Atlas Mfg. Co.

How to Manufacture Absorbent Cotton.

Editor Textile World:

Can you give us full information as to the manufacture of absorbent cotton? We are very anxious to learn just the method of manufacture of this article, and trust that you may be able to help us out.

Massachusetts. C. T.

The object of making cotton absorbent, of course, is to have it so prepared that it will readily take up moisture. In order that cotton should do this, it must be free from all natural oil that may be attached to the fibres. Any process that will accomplish this end, is all that is necessary.

The usual process may be given as follows: The cotton must be of high grade, and as free from impurities as possible.

The cotton is first carded into a bat, and then treated thus: Boil in 5 per cent. solution caustic potash or soda, for ½ hour, or till saponification takes place between the alkali and the fat, or oil, in the cotton.

Wash to remove soap formed by the combination of the alkali and oil.

Press out the water.

Immerse in 5 per cent. solution chlorinated lime, for 15 or 20 minutes.

Wash.

Dip in water acidulated with hydrochloric acid.

Wash.

Press out water.

Boil for 15 to 20 minutes in 5 per cent. solution caustic potash or soda.

Wash well.

Dip in acidulated water.

Wash in pure water.

Press and dry quickly.

Cotton thus treated will lose about 10 per cent. of its weight.

Mule Spindles in the West.

Editor Textile World:

Will you kindly inform me if mules are used to any extent for cotton spinning in Illinois and Wisconsin?

H. D.

The Aurora Cotton Mills, Aurora, Ill., operate 16,000 mule spindles, and the Janesville Cotton Mills, Janesville, Wis., 6000. These are the only mule spindles in the States mentioned.

Silk and Its Manufacture.

Editor Textile World:

Can you tell me where I can find practical information concerning silk and its manufacture?

Pennsylvania. C. S. M.

We would suggest that our correspondent consult the following authorities:

Dycing of Textile Fabrics, by J. J. Hummel. Price $2.

Silk Dyeing, Printing & Finishing, by George H. Hurst. Price $2.

Silk Weaving, being a theory of weaves. A practical treatise by A. Wolffensberger. This book has specimen cloths on different weaves, and can be bought of Paul Wenzel, 31 East Twelfth St., New York.

The Textile Manufacturer, a monthly journal published in Manchester, England, has articles quite frequently on silk and silk manufacturing that should be of special value. There was an excellent article in this journal in 1885 on reeling, throwing, dyeing, printing and finishing, and also an article, in 1895, on designing, coloring and manufacture of silk. The subscription price of this journal is $4 a year.

Artificial Silk.

Editor Textile World:

During a recent trip through Vermont, I saw a sample of yarn so closely resembling silk that it was impossible to detect the counterfeit without the aid of a powerful glass, and also fabrics woven from it. I was told that this yarn was a direct production of wood pulp, and was the discovery of a Frenchman, and that it was patented. Can you give me any information in relation to it?

Massachusetts. J. O. W.

If our correspondent will turn to page 44 of our last month's issue, he will undoubtedly find an article that will cover his inquiry.

Draft and Change Gears.

Editor Textile World:

Can you recommend to me a book that will tell how to get draft and change gears for any hank roving in a cotton mill; also, a book with standard yarn tables.

Massachusetts. L. D.

We would suggest getting Cotton Spinning Calculations, by William H. Cook. Price $1. Also W. S. Kelley's pamphlet on Standard Yarn Tables. Price 10 cents.

Help to J. P. T.

Editor Textile World:

I notice in your March issue, a communication from J. P. T., Ontario, in regard to certain defects in union blankets made by him. I have a theory for the making of the holes in his blankets, that have troubled him. J. P. T. says that he puts one tea-cup of sulphuric acid and one tea-cup of oxalic acid to a given quantity of blue. Now, as all should know, acids, as a general thing, cut blues, and generally come to the top of the solution, when allowed to stand. Is it not possible that J. P. T. takes that acid off, or does he blue his goods with that acid left in? If so, I think his

trouble lies right there. Weak solutions of sulphuric acid have no material effect, so to speak, on wool, when dried, any more than to leave the fibre a little harsh to the feel, whereas, in cotton, it is entirely different, which fibre it will disintegrate more or less. When carbonizing rags containing wool and cotton, they are steeped in sulphuric acid, and then treated at about 110 deg. C., when the cotton can be beaten out as dust, and the wool left intact. I would suggest that J. P. T. put a little damp litmus paper on the edges of his goods, to see if it responds to the acid test.

S. E.

Sparking Brushes.

Editor Textile World:

I have a 125 volt, 60 Am. dynamo, made by the G. E. Co., which has run very nicely for three years, but now gives trouble by sparking.

The brushes are carbon and the commutator is smooth. When the brushes are trimmed good, the sparking is confined to one set, but at times all of them spark.

I have examined the machine very carefully, but cannot locate the trouble.

The sparking is not violent, but very annoying.

Annadale, N. Y. W. J. F.

The sparking at your commutator is probably due to one of the following causes: Untrue surface, due to wear; copper worn away so as to leave mica too high between segments; or a loose connection at one or more segments with the armature leads.

If the commutator is much out of true, the only remedy is to put it in a lathe and true it up; finish with a fine, sharp, single cut file, but use no emery under any circumstances, as it sticks in the copper.

The copper segments wear faster than some kinds of mica, so that the mica between segments extends beyond them, and raises the brushes slightly as they pass over; this causes bad sparking, but can be remedied by using very fine sandpaper or a sharp single cut file, when the armature is run without the brushes in position.

In case of sparking due to a poor or loose connection between the armature winding and commutator, the spark always eats away and blackens the segment from which the brush moves to the one having the poor connection, as this movement from a good connection to a poor one tends to break the current, and this causes a spark, just as though a switch were opened.

If your commutator shows no especial blackening or wear at any one segment, the trouble is probably due to one of the first named causes, and should be treated accordingly.

—Pennsylvania. Quakertown. The Quakertown Silk Mill has been purchased by C. B. Vaughan.

New Publications.

Appleton's Popular Science Monthly for April. New York: D. Appleton & Co. Price $5 per year. This number appears with its usual quota of interesting articles, relating to practical science and allied subjects. An extremely interesting article appears by H. Ellis, the English psychologist, on "The Stuff that Dreams are Made of." Doctor Ellis analyzes a number of curious dreams, and clearly shows their origin in previous waking impressions. The series of papers on Taxation, by the late Hon. David A. Wells, is continued. A very instructive study of the problems connected with the treatment of the feeble minded is given in an article entitled "Mental Defectives and the Social Welfare," by a physician at a large establishment for the care and training of the feeble minded. The wheat problem is discussed by Edward Atkinson. The widespread interest in the wheat question gives articles from such writers great importance. A very delightful and instructive account of the spring bird migration as it may be observed in the Delaware Valley, is presented in an article entitled "The Coming of the Catbird." The Physical Geography of the West Indies appears as the first of a series by Dr. F. L. Oswald.

Dyestuffs. Volume I, 1898. This is the title of a monthly publication that we have just received in bound form from Wm. J. Matheson & Co., Ltd., 182 Front St., New York. This volume is very handsomely gotten up, with flexible covers, containing many articles of value to dyers.

Steel Plate, Steam Pulley, and Electric Fans. This is the title of an illustrated and very handsomely gotten up catalogue of 132 pages, issued by the B. F. Sturtevant Company, Boston, Mass. This catalogue is well worth obtaining, even if manufacturers are not in immediate want of what is represented therein. The information concerning fans for factory use is of more than usual interest. The superiority of steel plate fans, and their recognition of the standard type for all general purposes of ventilation, heat and mechanical draft, where a large volume is required without excessive speed or pressure are set forth. The catalogue is devoted exclusively to the illustration and description of fans of this class. Especial attention is called to the various forms of steel plate electric fans, which are constantly finding new adaptations, as the use of electricity as a motive power is extended.

Working Men's College. Prospectus for 1899. This is the title of the 12th edition of a catalogue relating to the Working Men's College, Melbourne, Australia. This catalogue possesses much of interest, as describing a scheme for educating the working men of Australia. The college was founded for the purpose of improving the education of those who are working, and especially to facilitate the attainment of a knowledge of handicrafts, arts, sciences and languages, by the establishment of classes, workshops, libraries, reading rooms, laboratories, museums, and by such other means as may from time to time be devised.

Bronze Chrome Brown B S, issued by the Farbenfabriken of Elberfeld Co., New York, being a color card showing the merits of this dye, as used on cotton. We think it might be of some ad-

vantage to dyers, if they would send for a copy of this card.

Lead Pencils. The Joseph Dixon Crucible Company, Jersey City, N. J., have issued a pamphlet of 32 pages, illustrated with their products of lead pencils, with special reference to the use of teachers, and in the office, as well as to artists.

Mechanical Draft. Bulletin J, issued by the B. F. Sturtevant Company, Boston, is an eight-page pamphlet, relating to mechanical draft, including forced draft and induced draft. It is an instructive piece of literature, that we would suggest our readers writing for.

Printing on Woolen Cloth and Yarn. This is the title of a book issued by William J. Matheson & Co., New York, with descriptive matter and recipes with samples, relating to the printing of woolen cloth and yarn. The following subjects are taken up and practically treated: Bleaching with Peroxide of Hydrogen; Printing and Steaming Goods; Machine and Hand Block Printing; Discharge Printing; Two-color Ladies' Cloths and Hats; Effects Produced with Soda Lye, etc. Dyers interested in this book should communicate with the publishers.

Industrial News.

—The Lombard Water-Wheel Governor Company, Boston, Mass., has received an order for three additional type "B" governors for the plant of the St. Anthony Falls Water Power Company of Minneapolis. The above governors are for the three additional units of four Victor turbines each, which are now to be installed. This will make in all ten Lombard Governors in the above named plant, regulating forty water-wheels.

—Paxton & O'Neill, 127 Bread St., Philadelphia, are very busy with orders for their improved hosiery machinery. Their business has shown a remarkably rapid increase, and they hold their old customers steadfastly.

—The E. Jenckes Manufacturing Company, Pawtucket, R. I., are now receiving the picking machinery built for them by the Howard & Bullough American Machine Company, Pawtucket, R. I. This machine company has recently received an order for over 10,000 spindles, from the Clark Thread Co., Newark, N. J., a portion of the spindles being for their O. N. T. Mill, and a portion for their Mile-End Mill. The Fletcher Manufacturing Company, Providence, R. I., have placed a large order for picking, cards, drawing and spinning frames, with the Howard & Bullough American Machine Company. The Statesville Cotton Mills, Statesville, N. C., have placed a repeat order for speeders and spinning frames with the Pawtucket machine company, which company will also soon equip the No. 2 mill of the Pee Dee Manufacturing Company, Rockingham, N. C., with 6000 spindles and 300 looms, besides carding room machinery.

—The Philadelphia Drying Machine Company, 6721 Germantown Ave., Philadelphia, have been running day and night for more than two months, principally on some large contracts for their Hurricane Dryers for Southern factories. This would seem to indicate that their improved dryers are being appreciated by up-to-date manufacturers.

—The Buffalo Forge Co. have removed their New York office from the Havemeyer Bldg. to larger and more commodious quarters at 114-115 Taylor Bldg., 39-41 Cortlandt St.

—We learn with much regret of the serious illness of R. Marsden, the well known editor of Textile Mercury, Manchester, England. Mr. Marsden is reported as lying dangerously sick with pneumonia, following influenza. We trust to hear of his early recovery.

—The Lowell Machine Shop now have permanent Southern offices in the English-American Bldg., Atlanta, Ga., for the accommodation of their large Southern trade.

—The Society of Arts of England, one of the oldest English scientific societies, having been founded in 1754, elected Director C. P. Brooks of the Textile Schools of New Bedford, Mass., to life membership of the society on March 15th last, on the proposal of Sir Henry Wood. It was this society that organized the huge international congress on technical education in 1897, at which Director Brooks was the United States representative, and of which he is now a member of the permanent bureau.

—We understand that the contract for the speed frames for the new Southern mill near Rockmart, Ga., being built by the New York mills, has been placed with H. G. McKerrow, 31 State St., Boston. He is also going to put some speed frames in their New York mills and into the Walcott & Campbell spinning mills. Mr. McKerrow has recently received orders from the Edgefield Mfg. Co., Edgefield, S. C., and from the Fairfield Cotton Mills, Winnsboro, S. C., the latter being a repeat order for roving machinery.

—The Mayo Knitting Machine & Needle Co., of Franklin, N. H., are very busy. They have been running for some time full handed and until 10 o'clock at night. Their needle department is also getting its full share of business.

—The mills in Utica are running full time, as also are the New York Mills. The No. 2 mill of the New York Mills is very busy. They have a fine organization, and there is a large demand for their product, which embraces corduroys, velvets, velveteens, shirtings and fancies. J. P. Campbell is superintendent; H. C. Phillips, assistant superintendent; W. H. Kingsley, overseer of weaving, with 850 looms under his charge, assisted by J. Shaw and Charles Caryl, as second-hands; D. G. Breheny is boss spinner; E. W. Callahan, boss carder; John Morgan, master machinist. The proprietors of the New York Mills are interested in a new mill to be built in the South, and there has been some talk of removing the machinery out of the No. 3 mill into the Southern mill and fitting up the vacant space with new machinery.

—The Cascade Mills, of Cohoes, have recently put in 170 quarter savers from C. M. Musgrove, Pittsfield, Mass. N. L. Birge & Sons, of Bristol, Conn., are also fitting up with Mr. Musgrove's quarter savers. The Bennington Knitting Co. recently fitted up the machines in their mill with improved brushers made by C. M. Musgrove, Pittsfield.

—The Lawrence Dye Works, Lawrence, Mass., have been using wool cleansed according to the Morse wool treating process, and write that they are satisfied with it, as taking on good and deep shades of color.

A Warp-Drawing Machine Company.

The American Warp-Drawing Machine Company has been incorporated in Maine with a capital stock of $3,000,000, of which $700,000 is eight per cent. preferred, as to dividends and assets, and $2,300,000 is common stock. The directors are B. P. Cheney, Sidney W. Winslow, Nathaniel J. Rust, George W. Brown, Theophilus Parsons, Edward P. Hurd, Thomas W. Slocum, C. D. Lanning and Millard F. Field. The purpose is to purchase all United States and foreign patents covering the Field warp-drawing machine, and manufacture and sell the machine and associated devices and mechanism. This machine is designed to draw the warp threads through the loom harnesses and reed preparatory to weaving on the loom in textile manufacture, and this is the only part of the entire textile process now done by hand. The company may operate in foreign countries by means of subcompanies. The par value of the stock is $25 per share, and the preferred stock is entitled to redemption at $50 per share after having been outstanding ten years, for which purpose provision is made from earnings by the creation of a trust fund.

A Good One.

A striking instance of satisfactory experience is shown in the following letter recently received by the Buffalo Forge Co., from the C. S. Burt Co., New Orleans, La.

C. S. Burt Co., 726 Cravier St.
New Orleans, La., 2/27/99.

Buffalo Forge Company, Buffalo, N. Y.

Gentlemen:—Noticing some of the certificates sent you in regard to your blowers, we will give you a good one. We have been using in our work something over 100 of your blowers, mostly of the largest sizes, each and every one of which has given entire satisfaction to our customers and to ourselves.

C. S. Burt Co., Ltd.

Employers' Liability Assurance Corporation.

Samuel Appleton and W. Tracy Dana have been appointed managers in the United States, and general agents in New England, for the Employers' Liability Assurance Corporation of London. Those appointments were made necessary on account of the death of George Munroe Endicott, who was for many years the manager, in the United States, of this corporation. These appointments are looked upon as being the very best that could have been made, and they meet with the warmest approval in insurance circles, as greatly strengthening the position that this corporation has held in this country. Both of these gentlemen have been connected with this company from the time of its advent in the United States. Mr. Appleton wrote the first policy the corporation ever issued in this country. Prior to his entering the employers liability field, he was a fire underwriter of marked ability, being the president of the Boston Manufacturers' Fire Insurance Company. He has built up for the Employers' Liability Assurance Corporation by far the largest and most profitable business that it has in the United States. Mr. Dana has been chief clerk of the corporation for the last ten years, and was the trusted friend and confidant of the late G. M. Endicott, practically having managed the affairs of the corporation for more than a year past. He is a man of fine personalities, a perfect gentleman, and thoroughly familiar with liability insurance. The Boston offices of the corporation will be hereafter at 71 Kilby Street.

C. Coles Dusenbury & Son.

One of the most familiar names in the New York dry goods trade is that of the above firm. It started business in 1849 as importers of carriage dry goods. For nearly forty years they ranked among the leading dry goods importing firms, and in 1888 their business having grown very largely, they removed to more commodious quarters, and about that time also took on domestic lines. A six years' growth again necessitated larger quarters in 1894, and again, on the first of February, 1899, for the third time, they removed from 83 Leonard St., into a new store on 396, 398 Broadway. In 1896, were added livery and uniform cloths, and they are still doing an importing business in both lines. Besides their large business in cotton warps from five ounces up to sixteen, they have a large trade in fine goods and fancies; in fact, it is a common expression in the trade, "If Dusenbury hasn't it, it can't be had." They are merchants as well as commission merchants. Manufacturers seeking an outlet for this class of goods would do well to communicate with this firm.

Perforated Metal.

Attention is called to the attractive advertisement on the outside back cover of the Harrington & King Perforating Co. of Chicago, with Eastern office at 284 Pearl St., New York. This company is, we believe, the oldest and largest manufacturer of perforated metal in the United States, and there is nothing in that line which they cannot furnish. Perforated metals of various kinds are used in different processes of textile manufacture, and manufacturers can hardly afford to neglect getting quotations from this concern when in the market for anything of that kind. They make a specialty of perforating metals for any special purpose desired, while the standard sizes of perforated tin and brass are always carried in stock.

The Strength of Cloth.

In the manufacture of cotton yarns, the breaking test is constantly employed, so that both manufacturer and buyer have a standard to live up to. The United States government requires that cloth that it buys shall be up to a required breaking strain, but the great majority of cloth examiners, buyers and sellers, still cling to the old thumb and finger test to determine the strength of fabrics. This is wholly a matter of judgment and thoroughly unreliable, and when the means exists for accurately determining the breaking strength of fabrics, it seems as if there should be no hesitation in availing of it. Some ten years ago, the publishers of the Textile World got up a machine for this purpose, but it was a comparatively crude affair, and although a number of them were sold and are doubtless still in use, it did not fully satisfy the makers and no more were made. Quite recently,

however, the Hercules cloth testing machine has been designed, and is in use in commission house circles and to some extent among the mills. It is certainly the best moderate priced machine that we have seen, and for ordinary requirements will answer every purpose. It indicates the breaking strength of any piece of woven fabric, pulling from one to sixty pounds. The strips to be tested are cut to a uniform size; or, better still, stamped out with a cutting die. The illustration in the advertisement on another page shows at a glance its method of operation, and we learn from those who are using it constantly that it is giving the utmost satisfaction. The price has lately been reduced to $20, which includes a handsomely finished oak cabinet. S. McKnight, 75 Spring St., New York, should be addressed for descriptive circular and full particulars.

The Atlas Mixing Picker.

We give below extracts from letters from prominent manufacturers who are using the new and improved mixing picker made by the Atlas Manufacturing Co., Newark, N. J.

"It certainly is one of the simplest, most carefully designed in all its detail, and most thoroughly built piece of textile machinery we ever saw. It is working finely."

"We have just this day started the picker and find it runs entirely satisfactory, in fact, I am delighted with the work it is doing. I have never seen a picker that will pick the stock as pretty and nice as this one does."

"I am very much pleased with the machine and know it does nice work."

In ordering a third machine, one firm writes as follows: "Duplicate last order of mixing picker—rush. We have had excellent results from the last machines shipped us, and feel no hesitancy in saying it is the best picker we ever had."

"The picker purchased of you, we have had in constant use, and are well pleased with the machine. We do not think we could improve on this picker, and would not sell it to purchase any other make."

See an illustrated description of this machine elsewhere in this issue.

Atlanta Office.

Messrs. John J. Keller & Co., manufacturers and dealers in aniline colors, dyestuffs, dyewood extracts, etc., and sole agents for John R. Geigy & Co., Basle, Switzerland, have recently opened a branch office in Atlanta, Ga., so that they may be in closer touch with their Southern trade. This office is located in the Kimball House Building, on 18 Pryor Street, and will be under the management of Mr. Robert Johnson, who has long been connected with the firm, and has a wide and favorable acquaintance among the mills in this section.

Silk Association.

The annual meeting of the Silk Association of America was held on March 28th, when the annual reports of the secretary, treasurer and of the representatives of the different branches of the industry were received, and the annual election of officers and managers took place.

The following were elected officers and managers for the ensuing year: President, Albert Tilt; First Vice-President, Catholina Lambert; Second Vice-President, Jacques Huber; Third Vice-President, Milo M. Belding; Treasurer, Charles F. Homer; Managers: Geo. C. Andreae, B. A. Armstrong, Eugene Atwood, C. L. Auger, H. W. Boettger, Frank W. Cheney, John E. Cowdin, W. E. Eaton, James M. Erskine, Ewald Fleitmann, John H. Hopper, A. G. Jennings, Bernard Loth, Jerome C. Read, Arthur Ryle, William Skinner, J. Noble Stearns, Jacob Weidmann, George L. Montgomery and Russell Murray.

Where are You Going for Your Vacation?

The American Institute of Instruction will meet in Bar Harbor, Maine, July 6-10, 1899. Are you going?

The meeting promises to be very large and enthusiastic, and characterized by good speakers. Among those who have accepted are: Governor Powers, of Maine, Hon. W. W. Stetson, State Superintendent of Maine, Mrs. Florence Collins Porter, President of Maine Federation of Women's Clubs, President Charles W. Eliot, Harvard University, Miss Sarah E. Hunt, Regent of Massachusetts Daughters of the Revolution, Prof. John M. Tyler, Amherst College, author of "Remarkable Lectures Before the Twentieth Century Club," Dr. Ray Greene Huling, Head Master English High School, Cambridge, Mass., Miss Mabel Emery, author of "How to Enjoy Pictures," Boston, Henry Chase, agent of Watch and Ward Society, Boston, Rev. A. E. Winship, Editor of Journal of Education, Mr. James P. Monroe, Boston, Mr. H. I. Smith, President of New England School Book Men, Miss Annie E. Logan, Principal of Training School, Cincinnati, Ohio, Prof. J. Liberty Tadd, Principal Public Industrial Art School, Philadelphia, Hon. Thomas B. Reed, President Nathaniel Butler, Colby University, Hon. Channing Folsom, State Superintendent of New Hampshire, Bishop William Lawrence and Hon. Horace G. Wadlin, Chief of Bureau of Statistics of Labor. The famous Temple Quartette of Boston are also expected.

Mt. Desert, on which Bar Harbor is located, is the largest island on the New England coast. Its mountains can be seen sixty miles from sea, and are remarkable as being the first landmark for seamen. In many respects it is unexcelled by any combination of natural views on the North Atlantic coast. In 100 square miles of territory are 13 mountain peaks, 17 ponds and lakes, with gorges, glens, promontories, and harbors of unusual beauty.

The hotel accommodation is ample, the cottages are spacious and beautiful, and form altogether the fashionable summer resort of Maine. Bar Harbor owes its popularity to its pure, bracing air, its romantic and extended driveways, enchanting ocean views and grand mountain scenery. One familiar with the history and legends of the island, as he stands upon a rocky eminence and overlooks the islands, creeks and ravines, can easily imagine that a savage is about to emerge from some glen, or that the rude boat of two centuries ago is riding at anchor in the waters below.

Hotels, railroads and carriages offer generous reduction in rates. A rate of $7.00 for the round trip from Boston has been secured, and rates from other places will be in proportion.

For particular information as to program, railroad and hotel rates, excursions and other interesting particulars, see the twenty-page bulletin to be issued

early in April. Address Edwin H. Whitehill, Secretary, Bridgewater, Mass.

Annual Meeting of the New England Cotton Manufacturers' Association.

The annual meeting of the N. E. Cotton Manufacturers' Association will be held in Boston, on Wednesday and Thursday, April 26 and 27, in Chipman Hall, in Tremont Temple, No. 88 Tremont Street. The sessions will be called to order on Wednesday at 11 a. m. and 2 p. m., and on Thursday at 10 a. m. and 2 p. m. The full programme will not be issued until the meeting, but papers are expected on the following subjects: Roller Ginning; The Impairment of the Strength of the Cotton Fibre between the Field and the Cloth; The Gray Goods from the Bleacher's and Finisher's Point of View; What Belting Is Made Of, and Its Care; Oiling Fly Frame Spindles; The Drying of Cloth; Depreciation of Textile Machinery; Methods of Cost Finding in Cotton Mills; Points on Sizing, Finishing and Packing of Goods; Auxiliary Power Plants with Electrical Transmission; Automatic Conveying of Cotton from Storehouse to Picker-room; Industrial Institutions, their Organization and Regulation; The Cotton Trade with Our Newly Acquired Territories; The Competition of Southern Mills in 1850; The Apparent Advantages of Driving Mills by Means of Electricity; and Fallacies Concerning the Electric Drive.

Topical Questions: What is the superiority of iron beams over those of Southern pine for mill floors? What is the best method of coloring the inside walls of mills? How can a card room be ventilated without undesirable currents of air? What is the best way to keep mill hose for fire protection? Are automatic sprinklers a necessity in the dust flues from pickers? Is it economical to place compound condensing engines in a mill to supplement water wheels during the periods of low water, where the times of such service are short, and fuel expensive? Are not second-hand machines quite as good for purposes of instruction in technical schools, as new ones? Have the methods of sampling round bales proven satisfactory in practice? What are the relative merits of arc and incandescent lights for weave rooms? How far is it practicable to substitute frames for mules in spinning filling?

March Sales of Mill Shares.

	Lowest.	Highest.
Bates	125⅛	126
Atlantic	59	60
Hamilton Woolen	51	51¼
Boston	462½	462½
Chicopee	95	95
Hargraves	106	106
Laurel Lake	37⅛	37⅛
Richard Borden	110	111
Shove	92½	92½
Stafford	107½	110
Tecumseh	92½	95
Wampanoag	97½	97½
Weetamoe	62½	62½
Amoskeag	1705	1805
Border City	125	125
Chace	110	110
Flint	104¼	105
Laurel Lake	40	40
Merchants Mfg.	77⅛	77½
Parker	102	102
Naumkeag	68¼	68¼
Pepperell	1410	1410
Boott	802½	807½
Lyman	70	71
Hamilton Woolen	51	51
Lancaster	430	446¼
Hill	41¾	41¾
Washington Mills	129	129
Stark	1100	1150
Dwight	853½	853½
Merrimack	1107½	1107½
Wamsutta	102½	102½
Globe Yarn	90	90
Narragansett	98	98
Sagamore	105	105

—The office of the Novelty Dye Works has been removed to 212 Walnut St., Cincinnati, O. There also has been a recent change in the personnel of the establishment. Mr. Baldwin has retired and has been succeeded by Mr. H. E. White as treasurer. Mr. W. N. Rudy remains as manager of the works. They handle cotton hosiery yarns, carpet chain, window shade cord, dress goods, silks, woolens, mixed cashmeres and cloakings, and are prepared to give prompt and careful attention to all orders intrusted to them.

MILL NEWS.

Cotton.

New Mills.

—Alabama, Demopolis. John C. Webb is said to be contemplating the establishment of a cotton rope factory, and is desirous of receiving information and prices on machinery for making this class of goods.

—*Alabama, Huntsville. J. W. Pead, agent of the Merrimack Manufacturing Co., Lowell, Mass., informs us that the reports which have been received from the South regarding the size of their plant, are entirely incorrect. Many of these reports assume that a mill will be erected to operate 200,000 spindles, with a capital of $2,500,000. Mr. Pead says that the plant will certainly not consist of more than 25,000 spindles, nor will there be bleaching and dyeing at the start. As soon as matters are definitely settled, full information will be found in these columns.

—*Alabama, Mobile. Cooke & Laurie are the contractors who will erect the new Mobile Cotton Mills, at a cost of $25,000. The mills will have a capacity of 10,000 spindles, although only 5000 will be installed at the outset.

—Alabama, New Decatur. A. Strauss & Co., of New York, have closed a deal, by which they obtain the property in

New Decatur, formerly owned and used by the United States Car Company, on which, it is said, they will proceed at once to build a cotton mill, costing about $500,000, which will be completed during the year.

—Alabama, Tallassee. The Tallassee Falls Manufacturing Company's new mill building, which is rapidly approaching completion, will be 450 by 128 feet, four stories high, with a picker house, 130 by 70 feet, and power house 130 by 50 feet. The capacity of this mill will be between 50,000 and 60,000 spindles. Full particulars will be given at a later date.

—Georgia, Americus. The citizens of this town are said to be anxious to secure the location of a cotton factory and are offering inducements for that purpose. G. W. Council, president of the Planters' Bank in Americus, is interested in the movement.

Enlargements and Improvements.

—Connecticut, Willimantic. It is reported that the Willimantic Linen Company are about to erect a new mill in place of their old No. 3 mill, which has been abandoned and the machinery distributed among the company's other mills.

—Georgia, Barnesville. It is said that the Barnesville Manufacturing Co. will double their present capacity of 7416 spindles, during the summer, and that they will add another story to their present mill.

—Georgia, Cedartown. The Cedartown Cotton Manufacturing Co. is reported as contemplating the erection of an addition to their present mill building here, in which will be installed 9,000 additional spindles, giving the mills a total capacity of 20,000 spindles. The plant at present consists of 12,000 spindles.

Mills Starting Up.

—*Louisiana, New Orleans. We are informed that the party who will operate the old Semmes Manufacturing Company's mill at this place, is M. H. Elder, who at one time operated a knitting mill here. The mill is equipped for making coarse cop yarns, having 1700 new spindles and 20 mule cards with condensers.

—Maryland, Millington. The Unicorn Mills, which have been shut down for a considerable time, are having the plant repaired, and it is expected that the mills will start up early in April. Table cloths, napkins and towels will be the principal articles manufactured.

Mills Shutting Down.

—Massachusetts, Boylston. The branch mill of the Lancaster Mills Co., at this place, is being torn down, part of the machinery being taken to the Lancaster Mill, Clinton, and the rest broken up. Such machinery as has not been removed or torn down is still working, but the whole plant must be removed by April 1st. About 100 hands were employed in this mill, some of whom will go to the Clinton mills.

Woolen.

New Mills.

—*Minnesota, Minneapolis. Further details are at hand regarding the woolen mill which Mr. P. Nilsson, of Algate, Norway, president of the Norwegian Woolen Mills trust, desires to locate here. If the plant is started, it will begin on a comparatively small scale, employing only about 100 men at first. Should this project materialize, it is expected that work will commence about the first of June, and it will probpably be located somewhere on the river bank, North East Minnesota.

—*Maine, Oldtown. The Ounegan Woolen Company expect to have their new mill running on or about the first of June. The mill is 200 feet long and from 60 to 100 feet wide, three stories and a basement. The superstructure is built of wood, and the picker and boiler house of brick. The plant will be eqeuipped with six sets.

—*New York, Troy. The plant of the United Waste Manufacturing Co., which we recently reported was composed of Cohoes, Watertown and Troy manufacturers, will be located at Albia, near this city.

Enlargements and Improvements.

—*Kentucky, Louisville. The Beargrass Woolen Mills inform us that the improvements contemplated are for the purpose of changing from yarns to blankets. They will install about 20 new looms, and will build an addition for their accommodation. The foundation will be started about April 1, and they expect to be running on a fine grade of blankets about July 1.

—Maine, Madison. The Indian Spring Woolen Co. are reported as contemplating the erection of an addition of wood, 40 by 40, one story high, and it is probable that a substantial brick structure will be erected later to the height of the present building. The addition will be used for wool scouring and carbonizing. Other new machinery will also be installed.

Mills Starting Up.

—Connecticut, Buckland. The E. E. Hilliard Company's mills, which have been running on short time almost continuously for the last three years, resumed work on full time recently.

—*Connecticut, Montville. There is a rumor at this place that the Montville Woolen Company's mill will be started up again, after an idleness of several months.

—*Connecticut, Seymour. The addition which has been built by the Tingue Manufacturing Company, for the purpose of manufacturing new lines of cotton plushes, is now in full operation.

—Conecticut, Stafford. The Phoenix Woolen Company's mills started up in part last week, after a shut-down of two months.

Mills Shutting Down.

—Connecticut, Norwich. The Clinton Woolen Mills have shut down for an indefinite period, throwing about 250 hands out of employment.

—Connecticut, Shewville. The Glen Woolen Mills are reported as suspending work in all the departments, owing to lack of orders.

Knit.

New Mills.

—*Massachusetts, Pittsfield. It is now reported that nearly the full amount required by Musgrove Bros. for their proposed knitting mill has been subscribed and the project seems to be assured.

—New York, Pulaski. An underwear mill is being considered by R. W. Box. Mr. Box has a factory, 2½ stories high, 100 by 40 feet, operated by water power, and is thinking of installing knitting machinery. Should the project materialize, he informs us that he will start in in a small way on a special line.

—Ontario, New Hamburg. A new hosiery factory, which will employ about 25 or 30 hands, will be started up by F. Goebel.

—Ontario, Penetanguishene. D. J. Shanahan, mayor of this city, is said to be interested in the erection of a hosiery mill at this place.

Enlargements and Improvements.

—*Connecticut, Rockville. The James J. Regan Manufacturing Co., which has purchased the stockinet mill of Samuel Fitch & Sons, is about to make the alterations and improvements necessary. The cotton cards and cotton spinning frames will be replaced by three sets of woolen cards and spinning frames. The company will manufacture their own yarns.

—Georgia, Grantville. The Grantville Hosiery Mills are adding largely to their equipment.

—Georgia, Marietta. A new boiler room, 22 by 16 feet, in which will be installed a 60 H. P. boiler, is being erected for the Marietta Knitting Co. A dye house will be added later.

Mills Starting Up.

—Connecticut, Windsor Locks. The Medlicott Company's Mills are now running full time, after a long period of partial time.

—*Georgia, Athens. The Standard Mfg. Co., owned by William Dootson, A. H. Hodgson, J. H. Dootson and F. N. Dootson, are now operating 47 machines on cotton seamless hosiery.

—Massachusetts, Methuen. The Swain Manufacturing Company's knitting mill has resumed operations, after a shutdown of several weeks.

—*Ontario, Peterborough. The Peterborough Underwear Co. have now started up their $40,000 knit goods factory.

Mills Shutting Down.

—New York, Cohoes. The Pacific Mill, operated by Clarke & Holsapple, is shut down for an indefinite period.

—South Carolina, Alcolu. The Alcolu Knitting Mills, owned by D. W. Alderman & Sons, are closed down and the machinery is offered for sale. The plant consists of 15 knitting machines, five ribbers and five sewing machines, operated by steam power.

Silk.

New Mills.

—*Connecticut, Danbury. Work has been started on the foundation of the new silk mill which is being built here for J. G. Irving, and as soon as it is finished, about 15 hands will be employed, in the manufacture of silk hat bands and bow braid. Five looms will be operated, and later on Mr. Irving expects to add more, should the business warrant.

—*Connecticut, Watertown. Further particulars, which we have received, regarding the factory which we recently reported would be erected by M. Heminway & Sons Silk Co., state that the building will be three stories high, 48 by 124 feet, with an elevator tower 16 by 18feet. The contract for building has been secured by the Tracy Bros. Co., which contract calls for the work to be completed in two months.

—New Jersey, Nutley. The Underhill Manufacturing Company's works have been sold by Vietor & Achelis, New York, to Samuel Lobsitz & Co., of New York, who will manufacture silk goods. New machinery will be installed, and about 125 hands will be employed when the works are running on full time.

Enlargements and Improvements.

—*Connecticut, Middletown. It is announced, in reference to the Portland Silk Mills, that the original plan of erecting a two-story building is being reconsidered, and it is likely that the addition will be one story. Estimates will soon be asked on the erection of this plant.

—*Pennsylvania, Avoca. We are informed that the new silk mill, which we reported would be erected by W. H. Ashley, will be an addition to the Avoca Silk Company's mill, and will be used for the purpose of silk throwing. The ground will be broken as soon as the weather permits, when more definite details will be given.

—Pennsylvania, Williamstown. It is stated that the Lycoming Silk Mill Company will erect a four-story brick building at Newberry, which will give employment to between 300 and 400 hands.

Mills Starting Up.

—New Jersey, Paterson. J. Ehrlich & Co. are about to start up on the manufacture of silk in the mill formerly occupied by George W. Fulton & Co. on Ward St. They have purchased the machinery of this mill from H. B. Parke, who was appointed receiver for George W. Fulton & Co. when that firm assigned last year. It is said that Boston men are at the head of this new firm, and that the managers up to recently were operating the Hudson County Silk Co. of Union Hill, N. J.

Miscellaneous.

New Mills.

—Kansas, Lansing. The Kansas State Penitentiary expects to spend $40,000 for the machinery necessary to establish a twine plant. They wish to correspond with parties manufacturing binding twine machinery.

—Massachusetts, Methuen. A new firm has been incorporated under the name of the Methuen Hat Co., which has assumed management of the business of the old hatting concern of J. M. Tenney of this city.

—Massachusetts, Millbury. It is said that E. H. Sweet of Worcester, Mass., has started a hammock factory at this place, and is now installing the machinery.

—New Jersey, Lodi. The old schoolhouse building at this place has been purchased by Eugene Howe, who has established therein a dyeing plant.

—New Jersey, Paterson. The American Linen Fibre Co., of 129 Market St., Paterson, has been capitalized at $2,000,000, in shares of $100, and the incorporators are: Perley Putnam, of Laconia, N. H.; Joseph Burleigh, Laconia, N. H.; Joseph F. Cunningham, Brookline, Mass.; and J. H. Rogers, Paterson, N. J. This company is going into the bleaching and dyeing business, and will operate under the patents of Samuel D. Keene, of Providence, R.I. The plant is to be somewhere in Rhode Island, we believe.

Enlargements and Improvements.

—*Connecticut, Stonington. The addition which we recently reported would probably be made to the plant of the American Velvet Co., has been started, and the frame is now up.

—Georgia, West Point. The addition to the Lanett Bleachery & Dye Works is completed, giving employment to 50 more men. They are now prepared to bleach and dye cotton fabrics of any kind for the trade.

—Massachusetts, Lowell. The Lowell Mfg. Co. is reported as having added some new looms for the production of Axminster goods, and it is said that they will install 40 more very soon.

—Massachusetts, Plymouth. It is said that a new three-story mill, together with a boiler and engine house, machine shop, and a sea wall 700 feet long is to be built at the Plymouth Cordage Works. This will double their output. Lockwood, Greene & Co., of Boston, are the engineers.

—New Jersey, Rockaway. Extensive additions are being made to the plant of the Lionsdale Bleach, Print & Dye Works.

—*Rhode Island, Manton. The lower story of the new building which is being erected for James D. Minto, is completed, and work is now begun on the upper story. It is expected that the building will be completed within the next thirty days.

—Rhode Island, Saylesville. It is said that Frederick A. Sayles, proprietor of the Glenlyion Dyeworks, has decided to build an addition, which will consist of a brick building, 80 by 90 feet, two stories high.

Facts and Gossip.

—Alabama, Mobile. It is reported that there is some likelihood of the Cherokee Mills, which have been idle for a number of years, starting up once more. When running, these mills operated 1000 spindles, on rope, twine and batting. L. F. Irwin was president.

—Connecticut, New London. The Palmer Bros. Company, of this place, has been organized under State laws, with a capital of $500,000, succeeding Palmer Bros.

—Connecticut, New London. The American Silk Manufacturing Company, of New London, has been capitalized at $12,500,000, of which $5,000,000 is in preferred six per cent. stock, and $7,500,000 in common stock. It will control about 85 per cent. of the silk, thread and embroidery business of this country. Some of the most prominent companies interested in the new combination are: Nonotuck Silk Company, of Florence, Mass.; the Brainard & Armstrong Company, of New London; Belding Brothers & Co. of Rockville, Conn., and Northampton, Mass.; the Richardson Silk Company, of Chicago, the Carbon-Currier Company of San Francisco, William B. Hackenburg & Co. of Philadelphia, the Winsted Silk Company of Winsted, Conn., and the Ætna Silk Company of Mount Carmel, Conn. The temporary officers of the corporation are: Ira Dimock, president; B. A. Armstrong, treasurer; and Walter Noyes, secretary.

—Connecticut, Stamford. The Greenwich Trust and Deposit Company has been appointed receiver for the Rippowam Woolen Mills. The time for the presentation of claims is limited to three months from date.

—*Connecticut, Willimantic. The proceedings of the Rhode Island Hospital Trust Company against the Windham Manufacturing Company, will shortly come up in the Superior Court, and it is hoped that its affairs may be straightened out so that the mills will be in full operation again in about two months.

—Georgia, Augusta. The U. S. Court has ordered the sale of the Isaetta Mill. This factory operates 4300 spindles and 150 looms, on cotton plaids, rope and twine. It has been operated for the last five years by James Brotherton, as lessee.

—*Georgia, Columbus. The Chattahoochee Knitting Mills, Girard, Ala., across the river from this place, were sold March 7, and were purchased by the Eagle & Phoenix Company, for $2500, the upset price. It is said that the mill will be operated in full, and that new machinery will be purchased.

—Georgia, Dennard. There is some likelihood, it is said, of the idle Houston Cotton Factory being started up again in the near future. The plant consists of 2240 spindles and 60 looms, on the manufacture of sheetings. It is said that there is a possibility of a stock company being formed for the purpose of running the mill.

—Georgia, Griffin. Mangham Bros., bankers, of this town, inform us that they desire to correspond with some parties having practical experience in the cotton mill business as well as a reasonable amount of capital, who are desirous of engaging in cotton manufacturing in the South. They report themselves as willing to furnish from 40 to 70 per cent. of the capital, if the parties locating will contribute the balance for a plant to cost in the neighborhood of $50,000 to $75,000.

PERSONAL RECORD.

Cotton.

—I. W. Wright, of Greenville, S. C., has concluded to retain his position as superintendent of the American Spinning Co.'s mill, and will not, as was reported, succeed J. M. Spawn as superintendent of the Clinton Cotton Mills, Clinton, S. C.

—J. E. Whitesides, of King's Mountain, N. C., has succeeded Joseph Casey as boss weaver at the Harmony Grove (Ga.) Mill.

—W. A. Wheat, formerly superintendent of Cowpens (S. C.) Cotton Mills, is now assistant superintendent of the Mills Mfg. Co., Greenville, S. C.

—William Wayne, superintendent of the Frankfort Linen Mfg. Co.'s mill, Frankfort, N. Y., has resigned, the mill having closed temporarily.

—E. S. Trammell, lately with the Cawthon Mill, Selma, Ala., employed as secondhand of carding, has returned to Gaffney, S. C., to fill a like position.

—William F. Trieble, formerly with the Harmony Mills, Cohoes, N. Y., has been appointed overseer of the card room of the Pleasant Valley (N. Y.) Mill.

—W. Marshall Taylor, superintendent of the William Clark Co., Westerly, R. I., has been appointed superintendent of the Merrick Thread Co. of Holyoke, Mass.

—Ernest A. Thayer, formerly with the Whitin Machine Co., Whitinsville, Mass., has been appointed night boss carder at the Nourse Mill of the Social Mfg. Co., Woonsocket, R. I.

—Robert Schofield, overseer of mill No. 1 of the Rotch Corporation, New Bedford, Mass., has been promoted to overseer of mills Nos. 1 and 2, combined. The event was marked by the mule spinners of the mill tendering Mr. Schofield a complimentary supper.

—Charles S. Strolls, lately at the Liddell Machine Shop, Charlotte, N. C., has taken charge of spinning at the Wiscassett Mills, Albemarle, N. C.

—William Sherwood of New York, is now boss weaver at night at the Fulton Bag & Cotton Mills, Atlanta, Ga.

—W. K. Sanborn, superintendent of the Cedar Falls (N. C.) Mfg. Co., has resigned.

—William P. Shaw has been promoted from secondhand in the carding department of the Kerr Thread Mill, Fall River, Mass., to overseer.

—John Rifford, day overseer at the Nourse Mill, Woonsocket, R. I., has resigned on account of ill health. John Hanley is his successor.

—A. Russell Ramsdell has gone to Whitehall, N. Y., to take charge of the combing and carding in the Champlain Silk Mills.

—D. B. Rodman is now superintendent of the Mountain Island (N. C.) Cotton Mills, in place of J. D. Lokey, who has returned to the Atherton Mills, Charlotte.

—Henry Patnode, formerly of White Rock, R. I., has accepted a position as secondhand of ring spinning with the Uncasville Mfg. Co., Versailles, Conn.

—William Passmore, boss carder at the Henrietta Cotton Mills, Washington, La., has resigned and returned to New Orleans.

—J. H. Pettus has resigned as boss weaver with the Stonewall (Miss.) Cotton Mills, having accepted a position with the M. & O. Railway Co., Tuscaloosa, Ala.

—John McDermott, boss carder at the Grinnell Mill, New Bedford, Mass., is now employed in the Clark Thread Mill, Newark, N. J.

—D. M. Meekins has resigned as superintendent of the spinning room at the Red Bluff Mills, Clio, S. C.

—John McHenry, overseer of the mule room of the Saunders Cotton Mill, Saundersville, Mass., has accepted a position in the Millbury (Mass.) Cotton Mill.

—Calixce Mandeville, of Manville, has been engaged as boss spinner at night at the Nourse Mill, Woonsocket, R. I.

—J. C. Leadbetter, overseer of cloth room at the Falls Co., Norwich, Conn., intends going into business on his own account. Mr. Milligan, overseer of the cloth room at Jewett City, Conn., will be his successor.

—C. R. Lockman has accepted the position of overseer of spinning with the Pelham Mills, Pelham, S. C.

—Benjamin Kirk, overseer of mule spinning in No. 1 Harmony Mill, Cohoes, N. Y., has resigned and gone to Fall River.

—E. H. Knowles, superintendent of the cloth room of the Whittenton Mfg. Co., Taunton, Mass., has severed his connection with that company.

—E. C. Hendrick, of Salisbury, N. C., has returned to his old position as boss carder at the Highland Park Mill, Charlotte, N. C.

—G. E. Hays, formerly superintendent of the Savannah (Ga.) Cotton Mills, is now with the Massachusetts Cotton Mill, Lowell, Mass., as assistant superintendent.

—Hiram Hingham, recently boss weaver at the Wamsutta Mills, New Bedford, Mass., has been promoted to superintendent of a portion of the mills.

—Walter B. Hall, master mechanic at the mill of the Paul Whitin Mfg. Co., Northbridge, Mass., has resigned.

—A. W. Hunking, agent for the Massachusetts Mills at Lindale, Ga., has resigned. His successor is E. C. Beach, superintendent of the mills, who recently came there from the Lockhart (S. C.) Cotton Mills.

—T. W. Harvey, superintendent of the Holt-Morgan Mills, Fayetteville, N. C., has taken charge of the Charlotte (N. C.) Cotton Mills.

—Robert T. Grant, overseer of weaving at the Charlotte (N. C.) Cotton Mills,

has gone to the Popperton Cotton Mills, Jackson, Ga., and will be employed in a similar position.

—Walter Dall, of Northbridge, Mass., is the now master mechanic at the Warren Cotton Mills, West Warren, Mass.

—Fred Dobie, who has been for a number of years paymaster at the Hamilton Woolen Mills, Amesbury, Mass., has resigned.

—D. E. C. Clough, overseer of spinning with the Pelham (S. C.) Mills, has returned to his old position as overseer of carding and spinning with the Fairmont (S. C.) Mills. C. R. Lockman has taken his place at Pelham.

—Richard H. Cook, formerly superintendent of the Kerr Thread Mill, at a recent meeting of the American Thread Co. at Westerly, R. I., was officially appointed general superintendent of all the mills in the combination.

—J. F. Cunningham, superintendent of the Moore Cotton Mills, Taylorsville, N. C., has resigned.

—A. E. Collins, of Covington, Ga., has succeeded J. T. Brooks as boss carder in the mill of the Efird Mfg. Co., Albemarle, N. C.

—James H. Curran, employed at the Methuen Co.'s mills, Methuen, Mass., has been transferred to the mills of the Pemberton Co., Lawrence, where he will have charge of the napping department.

—J. H. Barwell, cloth room superintendent at the Henrietta (N. C.) mills, has resigned and gone to Clifton, S. C., to accept a position in the Clifton Mfg. Co.'s No. 3 mill.

—N. T. Brown, boss weaver at the Pilot Cotton Mills, Raleigh, N. C., has been promoted to the position of superintendent. John Fowler, secondhand in Hope Mill No. 1, has succeeded him as boss weaver.

—Thomas Bowers, formerly boss weaver at the Lanett Cotton Mills, West Point, Ga., is now secondhand of weaving in the Henrietta (N. C.) Mill No. 2.

—D. V. Brannon, who has been fixing looms at Clifton (S. C.) Cotton Mill No. 3, is now employed at the Charotte (N. C.) Cotton Mills as overseer of weaving.

—Paschal Boyd has been appointed superintendent of the Mooresville Cotton Mills, Mooresville, N. C., succeeding W. L. Saunders.

—F. S. Brown, of Jerusalem Mills, Md., has assumed the superintendency of the Quinn Mfg. Co.'s mills, Petersburg, Va.

—Elisha Burton, of Natick, has been engaged as overseer of carding in the Jackson Mills, Fiskville, R. I.

—F. W. Beattie, secondhand in the finishing room of the mill of the Pemberton Co., Lawrence, Mass., for 14 years, has resigned.

—A. E. Ball, who has been employed as overseer in the Elizabeth Mill, Hills Grove, R. I., on two previous occasions, has been offered a position as overseer.

—H. G. Anderson, for a number of years secondhand of the weave room of the Overland Cotton Mills Co., Denver, Col., has been promoted to overseer of spooling, warping and slashing.

—William E. Ball has been engaged as boss ring spinner at night and will also have charge of spooling and warping at the Nourse Mill of the Social Mfg. Co., Woonsocket, R. I.

—J. E. Cray, boss carder at the Dartmouth Mill, New Bedford, Mass., has resigned and accepted a place in Berkley, R. I.

—W. J. Graham, of Hope Mills, N. C., is now with the Holt-Morgan Mills at Fayetteville, N. C., as boss carder.

—A. F. Northcutt, formerly with the Pee Dee Mfg. Co.'s mills, Rockingham, N. C., has accepted the position of boss weaver at the Cabarrus Cotton Mills, Concord, N. C., succeeding W. P. Hornbuckle.

—Thomas Denning, boss carder and spinner for the Durham Cotton Mfg. Co.'s mill, E. Durham, N. C., has been elected superintendent of the Commonwealth Cotton Mfg. Co.'s mill, Durham, N. C., succeeding S. W. Holman.

—William Briggs, of Roanoke Rapids, N. C., has succeeded Thomas Denning as boss carder and spinner at the mill of the Durham Cotton Mfg. Co., E. Durham, N. C.

—S. W. Oliver has resigned as superintendent of the Kinston (N. C.) Cotton Mills to take charge of the new Bennettsville (S. C.) Cotton Mills.

—Capt. F. Dilling, at a directors' meeting of the Dilling Cotton Mill, Kings Mountain, N. C., was elected president to succeed the late H. S. Chadwick. Capt. Dilling was formerly secretary and treasurer of the mill. His son, C. A. Dilling, was elected secretary and treasurer.

—J. H. Blackwell, secondhand in the card room at the McColl (S. C.) Cotton Mills, has resigned on account of ill health. J. L. Wright, of Cherryville, N. C., has succeeded him .

—D. J. Garrett, boss carder at the Atherton Mill, Charlotte, N. C., has resigned and J. D. Lokey has taken his place.

—J. S. Lamb, boss weaver at Mill No. 1 of the Henrietta Mills, Henrietta, N. C., has been succeeded by T. J. Digby of Clifton, S. C.

—James Stockley, for the past five years foreman in the picker room in the Maginnis Cotton Mills, New Orleans, La., is now with the Galveston (Tex.) Cotton Mills in charge of their carding and picking rooms.

—Jeremiah O'Brien has succeeded George Ellam as overseer at the Whittenton Mfg. Co.'s mill, Taunton, Mass.

—Morgan H. Haytree, overseer of the mule room of the Whitinsville Cotton Mills, Whitinsville, Mass., has resigned. He has gone to Cohoes, N. Y., where he has secured a position.

—Hughes Fawcett, the linen importer of New York City, is receiving congratulations from his many friends upon the successful termination of the suit brought against him by the government on the ground of alleged customs undervaluations. The case has been pending for a long time, but when finally brought to trial, Mr. Fawcett was acquitted by the jury after they had been out ten minutes.

Woolen.

—Hubert Smith, for twelve years boss carder with the Bound Brook (N. J.) Woolen Mills, is now with the Conway (Mass.) Woolen Mills.

—James F. Skinner has resigned his position as dyer and finisher for the Monongahela Textile Co., Morgantown, W. Va., where he has been employed over two years.

—Charles S. Rice has been succeeded by W. G. Dexter as foreman of the weave room of the Carleton Mills Co., Sangerville, Me. Mr. Dexter has been in the mills for 17 years.

—Robert Redford, agent of the Arlington Mills, Lawrence, Mass., has resigned on account of ill health. William D. Hartshorne, superintendent of the mills, will succeed him.

—F. Platt has been engaged as boss finisher and dyer by the Monongahela Textile Co., Morgantown, West Va.

—Hiram J. Potter, cashier of the Washington Mills, Lawrence, Mass., has been made purchasing agent of the new woolen mill syndicate. Charles H. Kitchen has succeeded him at the Washington Mills.

—W. N. Pike, designer at the Mayo Woolen Mill, Millbury, Mass., has resigned to accept a similar position in Newport, Me.

—William O'Brien, of Broad Brook, Conn., has gone to Seneca Falls, N. Y., to become boss dyer for the Seneca Woolen Co.

—Edward O'Brien, of Stafford Springs, Conn., has been engaged as boss picker by the Somersville Mfg. Co., Somersville, Conn., R. Burbank having resigned.

—Patrick H. Norton, of Factory Village, has accepted the superintendency of the Nawoc Woolen Co., Readville, Me.

—George J. Neff is now boss finisher at the mills of Edwin Hoyle & Son, West Millbury, Mass.

—J. S. Murr has recently accepted a position with the Washington Woolen Mills at Fredericksburg, Va., as designer and overseer of the weaving room.

—Walter R. McGregor has accepted the management and superintendency of the mills of the Laurel Mills Mfg. Co., Roswell, Ga. He was formerly superintendent for Speight & Robertshaw, in their worsted cloaking mill in Philadelphia.

—W. R. Merchant of Providence, R. I., has accepted the position of boss weaver at the Coburn Woolen Mills, Skowhegan, Me.

—James McDonald, formerly superintendent of the Thomas Kay Woolen Co., Salem, Ore., is now manager of the Napa Woolen Mills, Napa, Cal.

—J. Herbert McMillan, of North Bellingham, Mass., has been engaged as boss dyer by the Hope Valley Woolen Co., Hope Valley, R. I.

—Peter Lacy has succeeded G. N. Farlow as superintendent of the Doe River Woolen Mills, Elizabethton, Tenn.

—G. W. Loveland, of Gilbertville, Mass., has succeeded John Wheeler as boss carder at the mill of Holden, Leonard & Co., Bennington, Vt.

—John H. Lloyd, formerly employed at the Blackinton Mills, Blackinton, Mass., for several years, is now superintendent of the Blackstone Woolen Mills, Blackstone, Mass.

—Charles Johnson, formerly carder with the Cavendish Woolen Mills, Cavendish, Vt., is now with the Old Town Woolen Co., Old Town, Me.

—John B. Hutchinson, formerly with the Collins Mill, Collinsville, Mass., has secured a position as boss carder for the Concord Mfg. Co., Penacook, N. H.

—Linwood Greene has resigned as overseer of dyeing in the Wilton (N. H.) Woolen Co.'s mill.

—F. A. Garnsey, superintendent of the Cordaville Woolen Mill, Cordaville, Mass., has resigned and gone to his home in Sanford, Me.

—John Gaham, of Putnam, has accepted the position of boss dyer for the French River Textile Co., Mechanicsville, Conn.

—Roy Evans, formerly with the Social Mfg. Co., Woonsocket, R. I., has accepted the position of secondhand in card room at the Clinton Worsted Co.'s mill, Clinton, Mass.

—T. S. Drury, recently at Gardiner, Me., is now employed as boss weaver and designer at the Conway (Mass.) Woolen Mills.

—A. G. Davis, formerly with the Carleton Mills Co., Sangerville, Me., is now with the Sangerville Woolen Co. in the weave room.

—George W. Clark, for several years a designer in the Pontoosuc Woolen Mill, Pittsfield, Mass., has resigned and gone to Lyme, Conn., where he has entered into business with a mill owner there in the manufacture of woolen goods

—Frank Collins, overseer in the worsted spinning and drawing departments of the Sawyer Woolen Mills, Dover, N. H., has resigned, and accepted a similar position at the Arlington Mills, Lawrence, Mass.

—John Powers, formerly overseer of dyeing with the Warren Woolen Co., Stafford Springs, Conn., has secured the position of foreman dyer at the Bound Brook Woolen Mill, Bound Brook, N. J.

—William Driscoll, formerly overseer of spinning for the Holliston (Mass.) Yarn Co., has accepted charge of carding and spinning for the Saxton River (Vt.) Woolen Co.

—Thomas Kingsley, formerly with the Hampden Woolen Mill, Hampden, Mass., is now with Beebe, Webber & Co., Holyoke, Mass., in charge of their carding department.

—Peter Casey, overseer of carding for the French River Textile Co., Mechanicsville, Conn., has severed his connection with that firm.

Knit.

—B. S. Wadleigh has been appointed superintendent of the Oriental Mills, Lakeport, N. H., George W. Cole having resigned.

(Concluded on page 127)

All Belts with
CLING-SURFACE
on them
can be run as slack
as this.

This Little Belt (12 in.) was our first slack belt. It earned $640.00 in two years, in increased power, at a cost of only $63.00 for CLING-SURFACE, for the whole plant.

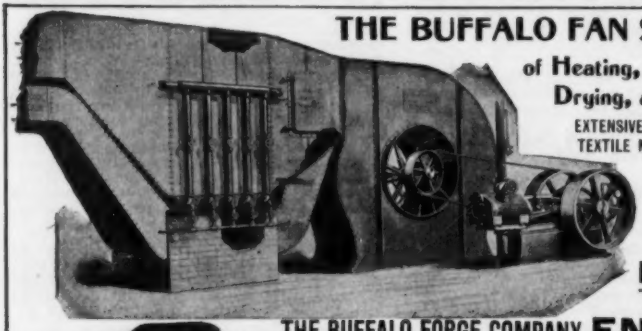
WE GUARANTEE

That with the use of CLING-SURFACE all belts will STOP slipping, that THE POWER WILL BE PERMANENTLY INCREASED, that belts can be run SLACK, that in leather belts the leather will become as SOFT as calfskin and ABSOLUTELY WATERPROOF; and furthermore that the INCREASE in power in a fair-sized plant will earn the cost of the sample can EVERY month, if used as directed. This applies to all belts, leather, rubber, cotton or a rope drive, whether they are new, old or oily.

Boston Branch: 170 Summer St.
CHAS. F. CHASE, Mgr.

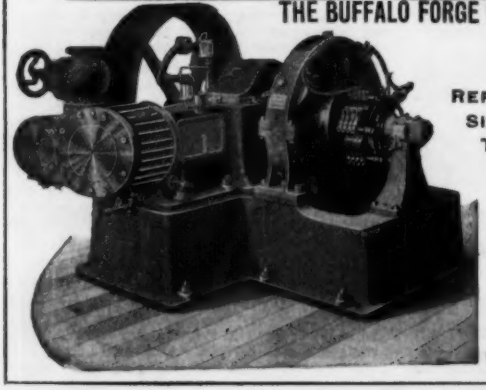
THE CLING-SURFACE MFG. CO.,
199-205 Virginia St., Buffalo, N. Y.

THE BUFFALO FAN SYSTEM
of Heating, Ventilating, Drying, and Cooling.
EXTENSIVELY USED IN TEXTILE MILLS.



The Buffalo Cotton Elevating Fans.

THE BUFFALO FORGE COMPANY ENGINE.



FIRST AWARD AND GOLD MEDAL AT OMAHA, 1898.

REFINEMENT OF REGULATION.
SIMPLICITY OF DESIGN.
THOROUGHNESS OF CONSTRUCTION.
EXCELLENCE OF FINISH.

Catalogue of all on application.

Buffalo Forge Company,
BUFFALO, N. Y., U. S. A.
New York. Cleveland. Chicago.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.

Ferguson, John W, Paterson, N. J.

Automatic Feeds for Cotton and Wool.

Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.

Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.

See under Yarns.

Belting.

Albany Belting & Supply Co., Albany, New York.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Boston Belting Co., 256 Devonshire St., Boston, Mass.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
See also Mill Supplies.

Belt Dressing.

Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.

Belt Hooks.

Field, Frank E., New Haven, Conn.

Bindings.

See Tapes and Braids.

Bleaching Materials.

Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbin Holder and Thread Catcher.

Burr Bobbin Holder and Thread Catcher Co., Hartford, Conn.

Bobbins, Spools, Shuttles, Etc.

Nashua Spool and Bobbin Co., Nashua, N.H.

Boxes, Cloth Boards, Etc.

Pearson, J. T, Kensington, Pa.

Braids.

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Brass (Perforated.)

See under Perforated Metal.

Brushers.

See Napping Machines.

Burr Pickers.

Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.

Ashworth, Elijah, Fall Biver, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.

Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.

Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.

Bullock & Crenshaw, 328 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.

Adriance, John S., 105 East 39th St., New York.

Cloth Testing Machine.

McKnight, S., 75 Spring St, New York.

Combs (Wool and Cotton).

Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods).

Dusenbury, C Coles, & Son, 396-398 Broadway, New York.
Hayes, O. H., 10 Thomas St., New York.

Copper (Perforated.)

See under Perforated Metal.

Copper Print Rollers.

New Bedford Copper Co, New Bedford Mass.
Phillips Co, The Thomas, Providence, R. I.

Copper Work for Dyers.

Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).

Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell,
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Dextrine.

Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.

Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyers, Bleachers and Finishers.

Brophy's, T, Sons, Jasper St, Philadelphia.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Merchants Dyeing Co., Sedgwick St., Chicago, Ill.
Orianna Bleach Works, 2580 No. 3d St., Philadelphia.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Birch Bros., Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks,

Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
American Aniline Co., 138 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St., Boston.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 278 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-66 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 23 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.

Dyers and Finishers.

American Yarn Printing Works, 134-150 North 22d St., Philadelphia.
Boston Finishing Works, Williamstown Mass.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Novelty Dye Works, Cincinnati, Ohio.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N.Y.
Eastern Machinery Co, The, New Haven, Conn.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.

Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.

American Express Co. offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feeders

See Card Feeds.

Feed Water Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Filters for Water.

New York Filter Mfg. Co., 26 Cortlandt St., New York.

Finishing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Fire Extinguishers.

H. R. Bennett, 1217 Filbert St., Phila.

Fluted Rolls.

Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

Fulling Mills for Woolen Goods.

Hopkins, A, & Co. Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.

Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.

Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ma.
Granger Foundry & Machine Co., Providence, R. I.

Gear Cutting Machine.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Grates (Boiler).

Earl & Wilson Co, Gastonia, N. C.

Harness Varnish.

D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.

See Ventilating.

Heddles.

Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.
Boston Belting Co., 256 Devonshire St., Boston.

Hydro Extractors.
American Tool & Machine Co., Boston.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie Machine Works, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Lamb Mfg. Co., Chicopee Falls, Mass.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St. Phila, Pa.

Lamps, Electric.
Edison, Thomas A., Jr., 27 William St., New York.
Gilmore Electric Co, L and 1st Sts, South Boston.

Looms.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1733 Barker St, Phila, Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators.
Ameledema Oilless Bearing Co., Berkeley St, Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.
Graphite Lubricating Co, Bound Brook, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Mitchell-Bissell Co., 170 Summer St., Boston.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.

Patent Solicitors.
Crosby & Gregory, 54 School St, Boston, Mass.
Phillips & Anderson, 53 State St, Boston.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Harrington & King Perforating Co., 230 North Union St, Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
La Bar, L. T., Beateyestown, N. J.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills 2025 Naudain St., Philadelphia.

Pipe Covering (Magnesia).
Keasby, R. A, 83 Warren St, New York.

Pneumatic Conveying.
See Ventilating.

Porcelain Guides.
Mitchell-Bissell Co., 170 Summer St., Boston.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H, Co, 25 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 32d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jones, W. A, 53-59 South Jefferson Street, Chicago, Ill.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Saginaw Manufacturing Co., Saginaw, Mich.
Wall, William F. Rope Company, 56 South St., New York.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford. J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressing Irons, Gas and Air Heated.
Economical Gas Iron Co., C. H. Sheftall, Mgr., 305 307 Mercer St., New York.
Edwards Sad Iron Co, 1420 Chestnut St., Philadelphia.

Printers and Embossers.
Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
Hill, Jas, Mfg. Co, Providence, R. I.
Laminar, Fibre Co., No. Cambridge, Mass.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Sample Cards.
Merchants Sample Card Co., 79 Crosby St., New York.

Schools.
American Correspondence School of Textiles, Lowell, Mass.
Lawrence Scientific School, Cambridge, Mass.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Union Button Sewing Machine Co., 164 High St., Boston, Mass.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Shuttle Eyes.
Mitchell-Bissell Co., 170 Summer Street, Boston.

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Quaker City Chemical Co., Wayne Junction, Philadelphia.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.
Holbrook Manufacturing Co., New York.
India Alkali Works, Boston, Mass.

Spindles.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
Hill, Jas. Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.
Worcester Spinning Ring Co., Worcester, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Reutschler Co, Hamilton, O.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.

Tanks, Tubs and Vats.

Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.

Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, 229 Church St., Phila.
Friedberger & Co, Germantown, Pa.
Hamilton, J. H , & Co, 275 Church St, N. Y.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Thun & Janssen, Reading, Pa.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Tentering Machines.

See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.

N. E. Ventilating & Heating Co, 980 Manton Ave, Providence, R. I.

Testing Machines.

Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.

Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.

American Express Company.

Turbines.

(See Water Wheels.)

Ventilating Apparatus.

Allington & Curtis Mfg. Co , Saginaw, Mich., and East Cambridge, Mass.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).

Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watches and Clocks.

Elgin National Watch Co., Elgin, Ill.

Watchman's Clock.

Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116A Chambers St, New York.

Water Wheels.

Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.

Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)

Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.

Saginaw Manufacturing Co, Saginaw, Mich.

Wool.

Pratt, Daniel S., 180 Summer St, Boston

Wool Cleaning Compound.

India Alkali Works, Boston.

Wool Combing Machinery.

Crabb, Wm, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.

Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.

Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.

Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed. & Bro, 28 Strawberry St, Phila, Pa.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.

Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.

Becker, Chas. W, Agt, Amsterdam, N. Y.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St Philadelphia.
Slack, Wm. H. H., & Bro, Springfield, Vt.

Wool Sorters, Scourers and Carbonizers.

Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Morse Wool Treating Co., Norton, Mass.

Wool Washing, Preparing and Drying Machinery.

Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Phillips Co, The Thomas, Providence, R. I
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.

Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 45 Milk St., Boston.
Catlin & Co, New York and Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Crossland, Enos, Sons, Philadelphia, Pa.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.

Fleming & Chapin, Philadelphia.
Germantown Spinning Co, Germantown. Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E., & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Sanford Spinning Co, Fall River, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.

Glazed Yarns.

Eichmann & Sternberg, 530 Broadway, cor Spring St., N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, Frankford, Pa.
Meyer, John C. & Co., 87 Summer St., Boston.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Moore, C., & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Cohannet Mills, Taunton, Mass.
Colchester Mills, 86-88 Franklin St, New York.
Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St, N. Y.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y
Holland & Webb, N. Y.

Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Cranston Worsted Mills, Bristol, R. I
Eichmann & Sternberg, New York City.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Meyer, John C, & Co., 87 Summer St., Boston.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, Camden, N. J.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Crossland's Enos, Sons, Philadelphia.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co., Pawtucket, R. I.
King, Alexander & Co, 54 Leonard St, N. Y.
Rockwell, Edward M, Leominster, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Botany Worsted Mills, Passaic, N. J.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Elsasser, Albert R, Addingham, Pa.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Phoenix Mills Co, 12 Letitia St, Phila, Pa.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
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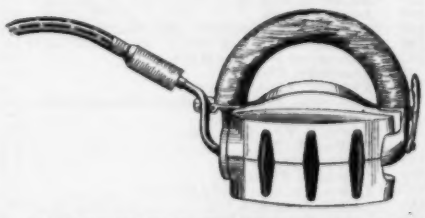

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We desire communication with, looking to the formation of a stock company to manufacture knit goods and knit specialties. Business now established. Head of the firm dead. Address U, care of Textile World.

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Special experience with all kinds of foreign wools. Would like to secure a position in the office of some wool importing or commission house or in a large woolen or worsted mill where such experience would be of value, as dyer, salesman or grader.

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GIBSON'S RECIPES.

Mrs. Gibson has consigned to us for sale all the original books of recipes with samples attached prepared and used by Richard Gibson, covering the entire period of his long career in the dyehouse as one of the foremost American dyers. Some of the recipes are doubtless very valuable. There are several large books and a number of smaller ones, papers, memorands, etc. Mrs. Gibson thinks she ought to get $100 for the lot. We think so too. The sample books, etc. may be examined at our office by interested parties. The entire amount goes to Mrs. Gibson. She informs us that there are no more copies of her husband's printed books to be had.

TEXTILE WORLD,
630 Atlantic Ave., Boston, Mass.

Patents.

(Continued from page 19.)

R. I., and Frederic E. Kip, Montclair, N. J., assignors to the Kip-Armstrong Co., New York.

Loom for Weaving Moquette Carpets. 621,720. Thomas M. Southwell and Thomas W. Head, Bridgenorth, England.

Loom Lay. 621,750. George A. Draper, Hopedale, Mass., assignor to the Draper Co., same place and Portland, Me.

Loom Lay. 621,751. George A. Draper and Charles F. Roper, Hopedale, Mass., assignors to the Draper Co., same place and Portland, Me.

Loom Let-Off. 621,277. James M. Peckham, Fall River, Mass.

Loom Picker. 621,725. Frank A. Wardwell, Methuen, Mass.

Loom Picking Motion. 621,303. George F. Hutchins, Worcester, Mass., assignor to the Crompton & Knowles Loom Works, same place.

Loom Take-Up Mechanism. 621,538. Oscar L. Owen, Whitinsville, Mass.

Loom Warp Stop Motion. 620,465. Charles A. Littlefield, Lowell, Mass., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Loom Warp Stop Motion. 621,310. James H. Northrop, Hopedale, Mass., assignor to the Draper Company, same place and Portland Me.

Lug Strap for Loom Picker Sticks. 620,469. Charles W. Lyon, Philadelphia, Pa., assignor to E. F. Houghton & Co., same place.

Mercerizing Apparatus. 620,550. William E. Aykroyd, William H. Aykroyd and Henry E. Aykroyd, Bradford, England.

Mercerizing Process. 621,477. Joseph Schneider, Ashton-on-Mersey, England.

Pile Fabrics, Apparatus for Cutting Pile Of. 620,951. George Motte, Roubaix, France, assignor to the Societe Motte-Bossut Fils et Mengers, same place.

Shuttle. 621,644. Emil Felber, Haledon, N. J.

Spinners, Tension-Producing Device for Twine. 621,234. George H. Ellis, Chicago, Ill., assignor to the Deering Harvester Company, same place.

Spinning Device. 620,202. Frederick L. White, Waterbury, Conn., assignor to George H. Clowes, same place.

Spinning Frame. 621,255. George W. Knight, Hopedale, Mass., assignor to the Draper Company, same place and Portland, Me.

Spinning Frame. 621,531. Charles Martinot and Aime Galland, Bitschweiler, Germany.

Spinning and Doubling Cotton, Etc. Apparatus for. 620,824. Thomas Ashworth, Urmston, England.

Spinning and Doubling Cotton, Etc. Apparatus for. 620,825. Thomas Ashworth, Urmston, England.

Spinning Machine Spindles, Bobbins and Thread Holder for. 621,318. Oliver C. Burr, North Adams, Mass., assignor to the Burr Bobbin Holder and Thread Catcher Company of Maine.

Spinning Machine, Yarn. 621,426. James H. Northrop, Hopedale, Mass., assignor to Draper Company, same place and Portland, Me.

Weaver's Scratch-Up and Pick-Out Comb. 620,490. Washington Ogden, Fall River, Mass

Weaving Figured Fabrics, Apparatus for. 621,776. Robert Heggie, Jr., Kirkaldy, Scot.

Wrapping Machine 621,714. Henry Rose, Gainesborough, England.

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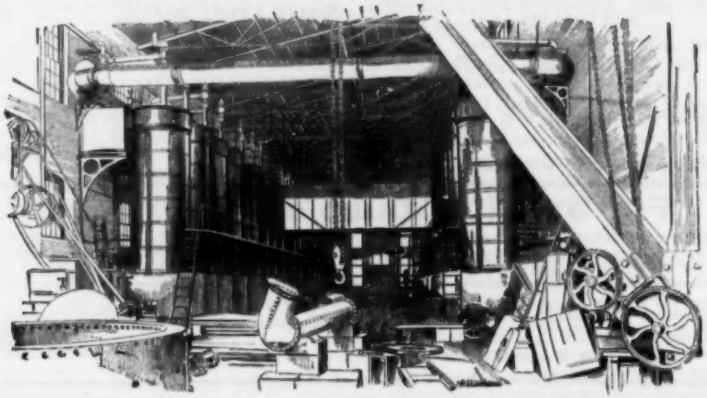

The above illustration is taken direct from a photograph, and shows the interior of a Boiler House, the Roof of which was designed and built by us for the Amoskeag Manufacturing Co., at Manchester, N. H. The building is 75 ft. in length, the walls being made of brick, and the roof being made of iron — iron trusses, iron purlins, and covered with corrugated iron, so that there is absolutely no woodwork anywhere about the building which can take fire. For Boiler Rooms this construction particularly commends itself.

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To sound industries substantial inducements will be given by many of the places concisely described in the pamphlet "100 Cities and Towns Wanting Industries." Write for a copy. Nearly all kinds of industries are wanted. Very liberal inducements are offered **Textile Industries** in the South by a number of good places. GEORGE C. POWER, Industrial Commissioner I. C. R. R. Co., Chicago.

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The advertisers in the following columns should be addressed in care of TEXTILE WORLD or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

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A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

218 **Woolen Superintendent, Designer** or Boss Weaver. Age 35; American. Has worked on all classes of dress goods and men's wear. Can furnish good references, and will accept a moderate salary.

1386 **Woolen Superintendent or** Boss Carder. Age 43; American. Familiar with the manufacture of all kinds of woolen goods, is well recommended, and can go immediately.

1490 **Superintendent** Age 37; German. Has worked on plain and fancy worsteds, cotton worsted, all woolen mixes and mixed cassimeres. 14 years' experience in this country.

1485 **Superintendent or Assistant.** Is acquainted with the manufacture of all kinds of heavy woolens and all makes of machinery. Age 35; English. Good references from England and this country.

1454 **Superintendent, Manager or** Designer. Has worked on worsteds, cassimeres and cheviots. Is Scotch, but has worked a number of years in this country and in Canada. Good references.

1443 **Agent or Supt. of Woolen Mill.** Age 42; married. Has been manager, supt. or assistant supt. for the last twenty years. Experienced in all classes of goods and makes of machinery. Has good references. A first-class manufacturer.

1452 **Superintendent or Designer** for woolen mill. Age 42; married, American. Has had a large experience, and is well recommended. Out of employment at present on account of his mill shutting down, and can take a position at once on moderate salary. Has worked on all classes of woolen goods, cotton warps, and has had 18 years' experience on fancy woolen dress goods. Familiar with the Knowles looms and Davis & Furber cards and mules.

1398 **Woolen Superintendent or De**signer of recognized ability and at present employed as a superintendent of 36 set woolen and worsted mill. He finds it necessary to remove from New Jersey on account of his wife's health. His past record is first-class and this is an unusual opportunity to secure the services of a first-class superintendent.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

COTTON SUPERINTENDENTS.

1337 **Manager or Superintendent.** Thoroughly understands manufacture of book binders' cloth, embossing, starching and calendering. 23 years with Wilson & Bently, London, England. English and American references.

1432 **Desires Position as Superin**tendent of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 30; married.

1236 **Supt. of Cotton Mill** desires to change position. Is thoroughly competent, steady and reliable. Good mechanic, manager, push and executive ability. Over 15 years experience, and fully understands how to keep production right as to quantity, quality, and lowest cost. Best system of economy maintained. First-class references can be given.

1464 **Superintendent of Fancy Cot**ton Weaving. Age 43; married; an American. Will not work outside Northern and Eastern states. Has worked on fancy goods of all kinds, white and colored cottons, worsteds and silks. Is familiar with all makes of looms and dobby heads. Is at present employed, but wishes to better himself, if possible. Refers to present and past employers.

1453 **Superintendent** desires position in a cotton mill Age 26; married; American. Has worked on prints, fine sateens, sheeting ginghams, duck, denims, cottonades, ticks, awnings and domets. Is familiar with all makes of spinning, spooling and warping machinery. At present employed, but wishes to obtain a more advanced position. Refers to present and past employers.

1332 **Supt. with long experience** in both Northern and Southern mills. Has started 3 Southern mills, on print cloths, broad and narrow sheetings and fine shirtings. First class references from all past positions. Age 48. Might accept position as overseer of large weave room.

578 **Cotton Superintendent** with experience as boss carder, master mechanic and superintendent on prints, sheetings, twills and sateens. An American of high character, and whose ability is proved by past record. Age 35, married; can accept position at once.

1496 **Superintendent or Boss Wea**ver. Age 45; single. Large experience on all classes of cotton goods and all makes of American machinery. At present employed, but wishes to obtain a better position. Now in charge of 1800 looms. Is willing to go South.

WOOLEN CARDERS.

1501 **Boss Carder on Woolen or** Knit Goods. Age 29; American. Has worked on percentages and all wool goods. Was 11 years with one firm as second-hand and boss carder.

1529 **Boss Carder or Spinner,** on woolen or knit goods. Scotch; age 48; married. Has worked on flannels, cassimeres and hosiery. Good references.

1523 **Boss Carder.** Age 29; married; American. Experienced on shoddy, wool, cotton mixes and silk noils. Has been in present position eleven years. Wishes to better himself.

1479 **Boss Carder, Second-Hand or** Card Grinder. Age 40; American. Can use all makes of American and English cards. Well recommended.

1475 **Wool Carder and Spinner.** Out of work because his mill shut down. An excellent carder and spinner, highly recommended. Prefers the West. Will start at moderate salary.

1470 **Boss Woolen Carder.** Experience on great variety of goods: cassimere, beaver, asbestos, wool, cotton and shoddy mixes, also in knitting mill. Well recommended. Age 31, married

1314 **Woolen Carder.** American. Age 30. Married. At present employed. Experience on beavers, cassimeres, cheviots, dress goods. Well spoken of by former employers. A first class man for a small mill.

1358 **Wool Carder,** now employed as second hand in large mill. Highly spoken of by past employers, habits, character and ability A1. Capable of taking charge of a room. Experience on high and low grade stock. Age 27. American, married.

1248 **Carder,** woolen. Age 37 years; married. 10 years with one of the best mills in New England. Dress goods, beavers, blankets, cotton warp hair lines and kerseys.

1378 **Overseer Woolen Carding.** American, age 32, married. With one mill 13 years, and another 4 years. Excellent references from each. A first-class carder in every way.

COTTON CARDERS.

1366 **Second-Hand Cotton Carder.** Age 30; married. At present employed, but desires to make a change. Good references.

423 **Cotton Carder or Supt.** At present in the South but desires to return to the North. Early training and most of his experience was in N. E. mills. Understands combing. Age 38. Married.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second-hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1469 **Cotton Carder and Spinner.** Has had charge of both in good mills. Excellent references. Age 37, married.

1339 **Cotton Carder,** young man holding first-class position in New York State, would like position in Eastern or Middle States as assistant superintendent or boss carder paying $5.00 or more a day. Is worth that salary; experience and references of the best.

WOOLEN SPINNERS.

1461 **Spinner, on Cotton or Wool.** Age 33; married; French. Has worked in one of the best thread works in this country, also in Alsace-Lorraine, on yarns from 70s to 160s. Is familiar with Dobson & Barlow machines and Schlumberger mules.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on cloakings, dress goods and Scotch tweeds in New England mill.

1276 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

1493 **Boss Spinner.** Age 25; unmarried; German. Has worked on cassimeres, cheviots, stockinets, satinets and camel hair goods. Can operate American mules, and has worked for several years in American mills, to which he refers.

1503 **Boss Spinner.** Age 38. Has worked on kerseys, meltons, cloakings, dress goods, carpet yarns, etc. Good references.

COTTON SPINNERS.

1519 **Overseer Spinning.** Age 31; American; married. Has worked on yarns from one run to 5½. Will accept an average salary. At present employed, but wishes to better himself.

1507 **Mule Overseer.** English. Age 30; married. Acquainted with all makes of machinery, English and American. Is a practical mule man, competent and reliable. Can figure on any mule, all the way through. Good references.

1522 **Overseer of Ring Spinning.** American; age 41; married. Has had a large and varied experience on print cloths, sheetings, drills, tickings, etc. Not at present employed, and will go anywhere.

1527 **Overseer Ring Spinning, Spooling** and Warping. Age 27; married. At present employed, but wishes to better himself. Can leave his present position in one or two weeks. Prefers to work in the Eastern States.

1498 **Overseer, Mule or Ring Spinning,** Spooling and Warping. English; age 38. Good experience in English and Canadian Mills. Well recommended.

1497 **Overseer of Ring Spinning.** Age 30; French. Experienced on fine and coarse yarn and all grades of cotton. Large experience and well recommended.

1502 **Second-Hand Spinning, Spool-** and Warping. Has worked principally on heavy sheetings. Age 30; single. Will go anywhere. Good references.

1504 **Overseer Mule Room.** Age 38; American. At present employed but wishes to better himself. Will not go South.

1471 **Overseer Ring Spinning,** spooling, warping, twisting. 13 years' experience in England and 6 years in this country. White and colored yarns from 5s to 90s. Refers to past employers. Age 38, married.

WOOLEN WEAVERS.

1517 **Overseer Woolen Weaving.** Age 37; married. Has had a large experience on all classes of woolens and worsteds. Will go anywhere

1521 **Overseer Weaving.** n woolen or cotton goods. Age 42; American; married. Has worked on all classes of cotton, woolen, worsted and silk goods. Refers to past employers and others.

1506 **Worsted Weaver.** English; age 33; married. At present employed, but wishes to obtain a more lucrative position. Will go anywhere. Experienced on all classes of worsted goods, fancy dress goods, etc.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1468 **First-Class Weaver** on fancy woolens, worsteds and meltons, cotton worsteds and shoddy goods. Can take overseer position after 6 days' notice. Has been loom fixer, boss and superintendent. Age 43. Crompton & Knowles looms.

1413 **Boss Weaver or Designer.** American; age 49. Has worked on beavers, kerseys, dress goods, cassimeres and all kinds of men's wear. Is also a good loom fixer.

COTTON WEAVERS.

1459 **Fancy Cotton Weaving,** Slashing, etc. Age 36; married. Has worked on all kinds of fancy goods and is thoroughly competent in all departments of manufacturing, with the exception of spinning. Understands velvet and corduroy weaving. Is not at present employed and can take a position immediately.

1425 **Overseer, Cotton Weaving** Age 38. Married. At present employed in large Mass. mill where he has been for 7 years as overseer. worked on all kinds of goods and is well experienced. American. Refers to past and present employers.

1380 **Overseer Cotton Weaving.** Held overseer's position for 5 years in Mass. mill, but now out because of change in management. A man of well-known ability. Age 48; married, American. One of the best weavers in New England. Will go South to a good position.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 33; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1353 **Weaver.** Age 29; single. Has worked on all classes of fine sheetings and sateens. Good experience and well recommended.

DYERS.

1457 **Dyer.** Age 26; has worked on yarns, pieces, raw stock, indigo vats and cotton yarn. Is at present employed, but can take a position on short notice. Refers to past and present employers.

1467 **Cotton or Worsted Dyer.** Large experience as second hand and boss. At present employed but desires change for good reasons. Would start at $2 50 a day.

1484 **Woolen Dyer.** Has had a large experience and can furnish the best of references. Age 47. Does not wish to go South or West.

1495 **Boss Woolen Dyer.** Age 36. Will take a good position as second-hand. Has worked on all classes of woolen and worsted yarns, hosiery, etc. Good references.

1491 **Boss Dyer.** Age 38; English. At present out of a position, and can go at once. Experienced on woolen and worsted hosiery.

1501 **Boss Dyer** on all classes of wool, woolen and worsted yarns, cotton warps, indigo, etc. Desires to change to better himself.

1476 **Boss Dyer.** Experience on kerseys, broadcloths, dress goods, cassimeres and worsted piece dyes. Has been in good mills for 3, 5 and 7 years and gave satisfaction. Would start in New England or Central States for $3.00 a day.

1278 **Wool Dyer.** Very successful and reliable and has had large experience. Practical indigo dyer. Can accept position at once. Best of references.

1513 **Boss Dyer.** Age 35; married; English. Has worked on underwear, piece dyes, raw stock and mercerized goods. Is acquainted with all makes of dyeing machinery.

1512 **Boss Dyer.** Age 33; married. Has worked on kerseys, cloakings, worsteds, wool shoddy and yarn. Will go anywhere.

1524 **Boss Dyer** Age 40; married. Acquainted with indigo, woad and hydro-sulphate vats. Has had a large experience, and is a good man for the position.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1428 **Overseer of Napping.** Young man just out of position because his mill stopped making fleece-lined underwear. Experience on French machines and Davis & Furber cloth and knit nappers. Can refer to leading Mass. mill men for whom he has worked. Will go west. Single.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1499 **Overseer of Finishing.** Age 43; American. Has worked on flannels, cheviots, cassimeres, fine suitings, broadcloth, hair lines, etc; from loom to case. Was 14 years with his last firm to whom he refers.

KNITTERS.

1450 **Foreman or Superintendent of Hosiery.** Age 40; married. Has worked on cut feet, seamless half hose, ladies' and children's hosiery. Is familiar with every standard make of knitting and sewing machines. Is first-class finisher, and can start new plant. Salary moderate. Prefers to go South, if possible. Refers to former and present employers.

1441 **Supt. or Overseer in Hosiery** Mill. Age 49; married. Wishes to obtain a position near Boston. Cannot take a position before January 1st, 1899. Has worked on all classes of knit goods and is familiar with all the leading makes of machinery. Refers to past employers.

1402 **Circular Rib Knitter** now holding position as overseer in N. Y. mill would like to secure better position. Has worked on spring needle and welt work silks, worsteds, cotton, tuck stitch ladies' forms. Can refer to present and past employers. Age 24. American.

1511 **Foreman Spring Needle.** Age 24; single. Has worked on all gauges from 14 to 32, on 28-gauge balbriggan principally; also, on fleece lined, cut dresser and spotted work. At present out of a position, and can go at once, if wanted.

1472 **Knitting Mill Superintendent** who has had 11 years' experience as superintendent and machinist. Has practical knowledge of the manufacture of all kinds of knit goods. References from past employers. Age 46, married.

1492 **Boss Knitter.** American; age 25; single. Large experience on ribbed goods. Is acquainted with all makes of knitting machinery. Well recommended.

DESIGNERS.

1509 **Designer, or Boss Dresser,** or will take superintendency of small mill. Age 38; married. Has worked on dress goods, fancy worsteds, cloakings and piece dyes. At present employed as boss carder, but desires to better himself, if possible.

1444 **Designer.** Has made a special study of designing during the past ten years. Wants a position which offers chance for advancement. Has worked on all classes of goods and is familiar with standard makes of machinery. Can fix, set up and has started sections of new fancy looms.

1445 **Designer or Finisher,** or will take position as supt. of a small mill. German, protestant, age 36, married. Has worked in several New England mills and refers to them. Graduate of the Werden Textile school, Saxony. Has worked on kerseys, beavers, cassimeres, cheviots, etc. Is familiar with all makes of American and German machinery.

1431 **Woolen Designer or Superintendent.** Young man, at present employed, desires to secure a position as above. Has been assistant superintendent of 18 set mill making fancy cassimeres and worsteds. Single. References show him to be a man of good ability.

1449 **Overseer of Weaving or Designer.** Age 38; married; American. Thoroughly capable. Has designed his own goods for eight years, and studied designing for two years. Left last position on account of sickness, and will take a small salary to start. Has worked on all classes of cottons, plain and fancy, and is acquainted with all makes of machinery. Refers to former employers and others.

MISCELLANEOUS.

1518 **Overseer Weaving.** Has worked on colored cotton goods, shirtings, dress goods, duck, heavy sheetings, etc. Age 46; married; American. At present employed. Wishes to better himself. Can leave on two weeks' notice.

1528 **Overseer Dressing Room.** Age 38; married; Scotch. Has worked on all classes of goods, from coarse druggets to the finest grade of fancy worsteds. Is acquainted with all forms of looms used in dressing. At present employed, but wishes to change his position. Will go anywhere.

1515 **Pay-Master and Shipping** Clerk. Will only work in Southern States. Will accept a moderate salary to begin.

1514 **Overseer Twisting, Spooling,** Winding and Reeling. Age 39; married; American. Has been in one position for 17 years. Wishes to better himself. Will go anywhere.

1520 **Overseer on Prints, Sheetings** and Shirtings. Age 32; married. Wishes to obtain a position in the New England States.

1516 **Warper, or in Charge of Spooling.** Age 44; married. Experienced on flannels, blankets, dress goods, cassimeres and carriage cloths. At present out of a position, and will go anywhere.

1525 **Master Mechanic,** in large woolen or cotton mill. Age 40; married; American. Is acquainted with nearly all kinds of textile machinery. At present employed, but can leave on reasonable notice. Will go anywhere. Excellent references.

1510 **Boss Worsted Carder.** Has worked on all classes of worsteds, and mohair alpaca. Is acquainted with all kinds of English and American worsted machines.

1418 **Cloth Hall.** Overseer, shipping clerk or paymaster. Has had a thorough experience in each of the above positions and is familiar with white and colored cotton goods. Is well recommended. Aged 35. Married, and is also a good all around accountant.

1488 **Boss Carpenter or Master Mechanic.** Age 46; American. Is acquainted with all makes of cotton machinery, and is a good man on shafting, wood work, etc. At present employed, but wishes to better himself.

1483 **Master Mechanic.** Age 33. At present second-hand mechanic in machine repair department of a large mill. Will not go South.

1500 **Overseer of Drawing Room.** Age 31. Has worked on Mohair, camel hair and carpet stock. Familiar with all kinds of foreign and domestic wool Was 14 years in one position and has excellent references.

1451 **Mechanic or Chief Engineer.** Age 37; married; American. A first-class mechanic and engineer. At present employed, but wishes to obtain a position where there is a better chance for advancement. Has been 2½ years in present position as master mechanic, and was previously for 13 years with one firm as department foreman, engineer and master mechanic. Refers to former and present employers.

1436 **Boss Dresser.** At present out of work because mill is running slack. Experience covers a large line of goods on D. & F. and Cleveland machines. Would start at $1.25 a day if work was steady. Age 26. Single. A very reliable young man.

(Concluded from page 109.)

—James Tague, employed by the Glenark Knitting Co. in their finishing department, has resigned and gone to Great Barrington, Mass.

—John Stack has been appointed assistant superintendent of the Sagamore Knitting Mills at Mechanicsville, N. Y.

—Fred Beavin, of Hudson, N. Y., has been engaged at the Pleasant Vale Mill, Greenwich, N. Y., as overseer of spinning.

—R. H. Kennedy, of Troy, has accepted the superintendency of the knitting mill at the Clinton Prison, New York.

Deaths.

—Isaac Mansfield, a retired knit goods manufacturer, died at his home last month in Germantown, Pa. He was born in Desford, Leicester, England, in 1818. In 1847 he came to America, settling in Germantown, where he was employed in the knitting mills of Joseph Crowson and the late Charles Spencer until 1861, when he embarked in business on his own account, retiring in 1883.

—Darius B. Smith, one of the oldest manufacturers of cotton duck in the country, died recently. He was born at East Haddam, Conn., November 19, 1815. At the age of nine he began work in the cotton mill. On reaching his eighteenth year he removed to Great Barrington and learned the trade of machinist, and at 20 was in full charge of Whitmore's machine shop in that city. A year later he entered into partnership with T. H. Spencer of Barrington, for the manufacture of machinery, which business was successfully conducted notwithstanding the hard times then being experienced. In 1841, at the age of 26, he went to New Hartford and together with his brother, John C. Smith, and Sanford Brown, established a cotton manufacturing business, and then was laid the foundation of the now largest cotton duck establishment in this state, of late known as the Greenwood Co. In April, 1845, their establishment was wholly destroyed by fire. They at once rebuilt and also built the cotton manufacturing establishment at Pine Meadow. After some years, Mr. Smith became the owner of the interest of Mr. Brown and his brother in the works at Pine Meadow, and from that time until his death conducted the business successfully. Mr. Smith was a man of exceptional business qualifications, a close observer of politics and public affairs, and will be much missed by the community in which he resided.

—Peter Thornley, a retired bleacher of Pawtucket, died last month at the age of 91 years. He was for a time employed in the bleaching department of the Merrimack Print Works and later was with the Providence Dyeing, Bleaching & Calendering Co. In 1842 he, together with Israel Saunders, carried on a bleaching business at what is now the Bolton Bleachery at East Greenwich, remaining there about two years. For five years, until 1850, he was in charge of the bleaching department of the Belleville Print Works, New Jersey, and then, for several years, was at the Saylesville bleacheries, retiring some years ago.

—George Dixon, late superintendent of No. 3 Harmony Mills, Cohoes, N. Y., died last month at the age of 72 years. He was in the employ of the Harmony Mills Co. for a number of years, having been boss weaver in No. 2, superintendent of Nos. 1 and 2, and in 1866, when No. 3 was constructed, he was made its superintendent, in which capacity he worke until his death. He had a very compre hensive knowledge of machinery and every branch of the manufacture of cotton goods.

—William G. Johnson, treasurer of the Miller River Mfg. Co., Athol, Mass., died at his home in that city on March 1st, after a long illness.

—Charles Sydney Whitehouse died at his home in Gonic, N. H., March 4th, aged 72 years. He entered the employ of his father, who at that time owned the mills in Gonic, as clerk and bookkeeper, and later assumed charge of the mills and also for five years controlled the mills at East Rochester. From 1882 to 1886, he was United States weigher at the Boston Custom House. Mr. Whitehouse took great interest in political affairs, and in 1892 was elected first mayor of Rochester under the new city charter.

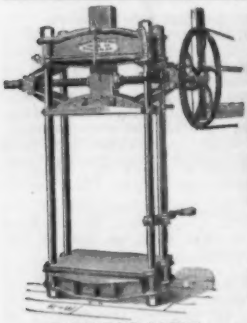
—Henry F. Woodmancy, aged 54 years, for over 32 years in the employ of the Whitin Machine Works, Whitinsville, Mass., having charge of the spindle job for a long period, died recently of inflammatory rheumatism. He secured a patent on a self-oiling spindle, in company with the late Gustavus E. Taft, which was called the Whitin Rabbeth spindle, the invention being one of the most valuable in the development of ring spinning.

—C. H. Alexander, boss dyer at the Shetucket Cotton Mills, Norwich, Conn., died suddenly last month of heart disease.

—L. C. Gibbs, for several years boss weaver at Hope Mills No. 2, N. C., died March 13 of consumption, aged 27 years.

—George Wankel died at his home, 7 Parker St., Utica, N. Y., of apoplexy, March 16th. Mr. Wankel was born in Heiling, Germany, April 13, 1828, and came to America in 1852. He worked in the Utica Steam Woolen Mills, and was placed in charge of the satinet fulling department, which position he held until the mills shut down in 1877. He then went to work in the fulling department of the Globe Woolen Mills, from which he retired about eight years ago. A widow, one daughter and five sons survive him.

—William Oastler died Saturday, March 25th, at the residence of his son, James Oastler, 113 Schuyler St. Mr. Oastler was born at Shipley, Yorkshire, England, June 17, 1816. At the age of 23, he came to America, settling at what is now Clayville, where he found employment in the woolen mill and learned the trade of dresser. From Clayville he went to the Pleasant Valley Mill, at Oriskany, where he filled the position of boss dresser, and later had charge of the dressing department at the Steam Woolen Mill in Utica, which position he filled very acceptably until the mill closed. He worked for a short time at the Wood & Mann Steam Engine Works and then retired and conducted a small farm in New York Mills until about a year ago, when he came to Utica to live with his sons.



KNUCKLE JOINT.

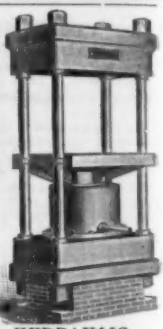
BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD.

Boomer & Boschert Press Co.

338 West Water St., SYRACUSE, N. Y.



HYDRAULIC.

TRADE MARK.

Chas. B. Cook, *Pres.* Arthur H. Mason, *Treas*

Capital Stock, $500,000.

SANFORD SPINNING CO.

Fall River, Mass.

32,000 Spindles. Weekly product, 65,000 pounds 6s to 30s.

Colored Cotton Yarn

From American Peelers and Egyptian Cottons.

Solids, Mixtures, Bleached, Combed and Carded Egyptians Cops and Cones.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn: Spinners are busy, although the price of yarn is low. The Southern yarn is in good demand for the backing of plush lined underwear, and the Eastern as well as the Southern mills are busy. The Eastern mills are making yarn for the face, and the Southern yarn is being used in good quantities for backing, although some Southern yarn is used on the face of these garments. Straight, flat underwear, out of cop yarn, is not in demand, but on plush goods the knitters have all the business they can handle. The ribbed underwear knitters are having a good business. This is practically a cotton season. Wool has gone out of style. Some of the mills are making their own backing yarn on woolen cards, buying fine Eastern yarn for the face of the garments. Prices for all these garments are low and the business unsatisfactory. The knitters who bought early in the season anticipating an advance, find that they can purchase yarn on the market today at a price cheaper than when purchased earlier in the season. This is on carded white and colored yarn.

The combination is still in evidence, but the prices are broken. There is always a spinner with a job lot of yarn on hand which he unloads under the combination price. The knitters are using stained yarn in place of Egyptian, because of the advance.

The ribbed underwear mills are still working on light weight underwear, but are getting ready to tackle the heavy weight season. The Western trade is booming on cheap fleece and ribbed underwear. Prices on Combed Egyptian are very much higher in proportion to the price of carded yarn on account of the combination, although mills are buying yarn below combination quotations. The finer counts are going slower, and are not in such great demand as was the case earlier in the season. Fine lisle yarn, both in Egyptian and Allen seed is in good demand. The fine yarn combination is working cautiously, and the trade has not yet felt its presence. The knitters throughout the Mohawk Valley are busy on cotton underwear, and are very sanguine at the outlook.

Worsted Yarn: Spinners are getting but few orders, and these are very small in volume. The spinners are not anxious to secure large orders on today's market. The trade seems to be waiting for the developments of the worsted cloth trust. Orders for cloth are backward, and buyers will place orders only as requirements necessitate. We note an undoubted demand for fancy worsteds, and mills on medium grades are well employed. Serges and piece dyes are selling, but it is noted that buyers are operating cautiously on this class of cloth. Tops are selling fairly well, and spinners evidently are running out of stock. Spinner-weavers that are contemplating going into the trust are reducing stocks as low as possible. There is no doubt but that a trust will be formed in this article, and a meeting has been called and the formation is now going on.

The spinners of French yarn have more orders. The knitters of hosiery are using worsted more this year than has been the case ever, and, in consequence, spinners of this class of yarn have booked good orders. The demand is for a medium yarn, and knitters who bought anticipating that the demand would be for finer grades, have yarn on hand for which they have no use, and must order more of the medium grade.

(Continued on page 131)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 36s.

Germantown, Philadelphia.

W. Warren Thread Works,

WESTFIELD, MASS.

HOSIERY AND SEAMING YARNS.

Also Polished Threads.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

Established 1884. *Telephone Connection.*

The Merchants Sample-Card Co.

ALFRED S. HATHEWAY.

MAKERS OF THE BEST

SAMPLE BOOKS, COLOR CARDS, Etc.

FOR ALL LINES OF MERCHANDISE.

255 Centre Street,

S. W. COR. BROOME ST. NEW YORK, N. Y.

Illustrated Catalogue Free on Request.

Knitting and Weaving Yarns

Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

EDWARD S. HYDE, 223 and 225 Chestnut Street, **Philadelphia, Pa.**

(Continued from page 129.)

The commission houses will not be easily forced out of business, as the trust will find to its sorrow later. It is undoubtedly a fact that the commission houses are largely responsible for the present condition of business. The mills staying outside the combine will get the benefit of these commission houses. There is much talk of a dress-goods combination, but as yet it is only talked, and has not yet been consummated.

Woolen Yarn: Spinners are getting few orders, but are anticipating business later. The heavy weight worsted business is late, and consequently weavers are backward in ordering backing yarn.

Many of the weavers are almost entirely out of the market for wool and yarn, not caring to stock up until the trust is formed and in working order. The knitters of hosiery anticipate a good business and orders will be placed for yarn within four to six weeks. This is not the case with the underwear knitters, all of whom are running cotton. We called at one mill and found that out of 13 sets of cards, 11 sets were running cotton and the other two were running shoddy.

The mills manufacturing the very best class of underwear are having a good trade. The medium mills are carding and spinning cotton almost entirely. It is an actual fact that wool salesmen are not working the knit goods trade to any extent, so little demand is there for wool. The mills not using cotton are mostly stocked with ante-tariff wool, and this helps the depression of some of these mills. Many of them have wool enough to last another year. There is much trust talk among the mills who have not been successful, and these are anxious for a combination. The mills having established reputations and doing good business will have nothing to do with the trust in knit goods. There is much dissention among those who wish to enter the combine, as each wants to go in on the same basis regardless of their earning abili-

(Continued on page 133)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
316 Church St., New York.
306 Chestnut St., Philadelphia.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
6 & 8 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 42s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

MERCERIZED EGYPTIAN COTTON SPINNING BANDS.

We claim for them

- They will not shrink nor stretch.
- Are not affected by dry or humid atmosphere.
- Are Fifty per cent. stronger than ordinary bands.
- Will last twice as long.
- Less power required to run spinning.

Mercerized Cotton Yarns which give the High Silk-Like Luster.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

YARNS

SOLIS : : BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

INDIAN ORCHARD COMPANY,

Indian Orchard, Mass.

Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercerized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.
We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.
We use a uniform grade of long stapled cotton in all our manufacture.

(Continued from page 131.)

ties or worth of machinery, and it now looks as though the trust would not be formed. The argument for the trust is that it will reduce the cost and also the price to the consumer; although if this be the reason, the average man fails to see it. There have been two propositions to form trusts in knit goods. One is known as the Peabody trust and the other the Baker trust. Each proposition has been working separately. One, which is largely a local affair, is being engineered by a banker by the name of Peabody, who proposes to form a trust with a capitalization of $27,000,000, and which is said to be largely "wind;" and the other is the Baker trust which is proposed with a capital of $75,000,000—$25,000,000 preferred stock—and $50,000,000 common stock. There is a guarantee of seven per cent. on the preferred stock. This is the combination which met at the Waldorf-Astoria Hotel in New York City. Not all the mills were present, but committees were formed and are to report at a future time. The Moses of this trust is a man by the name of John H. Baker of Philadelphia, who is very disinterested indeed. The trust pays him nothing for his services. His pay comes from those who underwrite, or put the stock on the market. The trust pays these underwriters five per cent. on the capital stock, we think. He apologized to the knitters and said he did not understand the knit goods business. He is the father of twenty-seven combinations, all trusts, and is wholly actuated by disinterested motives.

The spinners making 2-ply yarn are getting few orders, as wool has surely the go by this year, only cotton goods are selling. There is a movement to use silk noils for the backing of plush underwear, and silk noils will be used in large quantities. Thread waste is also coming into general use. There is also a fair demand for fine noils.

Colchester Mills,
SPINNERS OF
Made from Colchester Mills Sanitary Random Yarn
Mule Spun Cotton Hosiery Yarns.
Sales in Charge of A. D. SALKELD, 86 & 88 Franklin St., NEW YORK.
Representing B. B. Smalley, Thos. F. Patterson, F. E. Snow Receivers Colchester Mills.

WOOLEN AND MERINO YARNS. Special line for Bicycle and Golf Goods in all shades For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER, - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
KENNEBEC WORSTED MILLS.
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

ALBERT R. ELSASSER,
Clifton Worsted Mills,
WORSTED YARNS.
Lustre Worsted a Specialty.
Mills: Addingham, Del. Co., Pa.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns. Harness Twines.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & Co., Philadelphia and Boston.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist,
COTTON WARPS
HOUSATONIC, MASS.
4s to 60s.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade.
PAWTUCKET, R.I.

Established 1849.
CARRIAGE CLOTHS.
LIVERY CLOTHS.
ACCOUNTS SOLICITED.
Broad Cloths, Sackings, Cotton Warps, Whip Cords.
C. Coles Dusenbury & Son,
396 & 398 Broadway, N. Y. City.

HAYES, O. H. & CO.
Representative Lines of Woolens
O. H. HAYES & CO.
Liberal arrangements made with manufacturers or men controlling mills' productions.

Philadelphia Yarn Market.

Trade has improved somewhat the past month with the weavers. The hosiery trade is still dull, although in probably a little better condition than last month. The underwear trade has been active during all the season. Yarns have advanced slightly on the increased price of the staple, although business in general cannot be considered as warranting an increased price for yarn. Prices have been cut very badly, especially in the knitting trade. Woolen and merino mills are in rather better condition, although not yet active. We quote:—

Warps:—

20/1	12½ to 12¾
22/1	13
26/1	13¼
12/2	12½ to 13
14/2	13
16/2	13½
20/2	14
30/2	16 to 16½
40/2	22 to 23

Skein:—

20/1 soft	12½ to 13
19s	12½ to 13
26s	13
4s to 10s	11 to 12
12/2	11½ to 12
14/2	12
20/2	13¼
30/2	15½ to 16
40/2	22
8/3 hard	10½ to 11
16/3 slack	12½ to 13
16/4 slack	12½ to 13
16/2 slack	13

Southern cones (various qualities):—

6s to 8s	11 to 12
10s	11½ to 12½
12s	12 to 13
14s	13 to 14
16s	13½ to 14
20s	14 to 15
22s	14½ to 15
24s	14½ to 15½
26s	15 to 16
30s	16 to 16½

Shuttle cops:—

6s to 8s	12
12s	12 to 12½
16s	12½ to 13
26s	13 to 13½
40s	16½ to 17

Mixed colored cones:—

6s to 8s	13 to 13½
10s	13¼ to 14

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

WAVERLY WORSTED CO.
SPINNERS OF
WORSTED YARNS
FOR WEAVING AND KNITTING.
Main St. & Green Lane, Manayunk, Philadelphia.

Eddy & Street,
COTTON, YARNS WORSTED,
WOOLEN, AND SPUN SILK.
BRAIDS
PROVIDENCE, R. I.

RICHARD CAMPION,
Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
17 Bank Street, Philadelphia, Pa.

FRENCH AND BRADFORD SYSTEMS
B. F. BOYER & CO.,
WORSTED YARNS
IN WHITE AND MIXES.
Woolen and Merino Yarns
OFFICE AND MILL
Delaware and Cooper Sts.
Camden, N. J.

WE BUY FOR CASH!
ODD LOTS OF
YARNS AND WARPS
ENOS CROSLAND'S SONS,
Haverford Ave. and 69th St., PHILA., PA.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:

Broadway and Jefferson Ave., Camden, N. J.

Represented by FIRTH BROADHEAD,
937 Banigan Building, Providence, R. I.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

Worsted YARNS,

ALL NUMBERS SINGLE AND TWO-PLY,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

12s	14 to 14½
14s	14½ to 15
16s	15 to 16
Eastern cops:—	
10s hosiery	12½ to 13
14s	13¾ to 14
16s	14 to 14½
20s	15½ to 16
10s shuttle	13 to 13½
14s	14 to 14½

Eastern skein ½ cent above cops.

Eastern cones 1 to 1½ cents above cops.

Universal wound cones ½ cent extra.

Egyptian carded 5 cents to 6 cents above white.

Combed yarn 5 to 6 cents above carded.

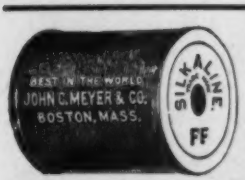
Wool spun yarn in poor demand, but rather firmer in price, on account of the advanced cost of cotton.

20 cut black cops	13 to 13½
26s " "	15½ to 16

FOWLES & CO.,
Importers and Dealers
WOOLS, NOILS, HAIR,
Shoddies, Waste, Flocks, Etc.
106 Church St., Philadelphia.

DANIEL S. PRATT,
180 Summer Street, - BOSTON,
ROOM 24.
851 Calle Piedad, Buenos Aires.
SOUTH AMERICAN WOOLS,
..Personally Selected..
Graded to the Standard of U. S. Markets.

THE GARFIELD WOOLEN CO.
MANUFACTURERS
Fine Wool Shoddies and Extracts,
in all grades and colors.
Carding, Picking, Carbonizing and Garnetting done for the trade.
GARFIELD, N. J.



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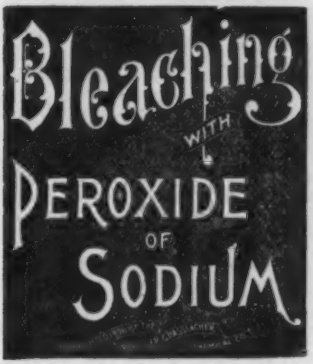

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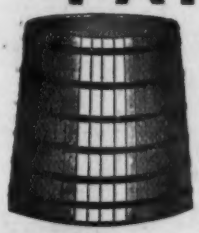

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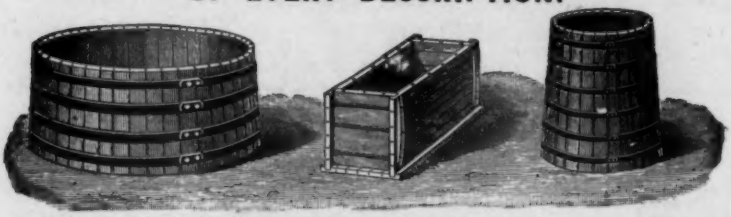

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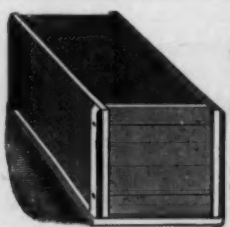

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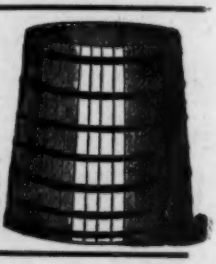

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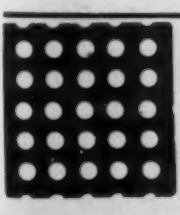

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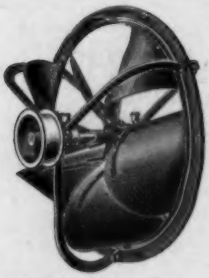

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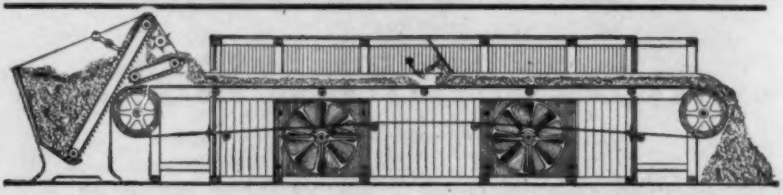

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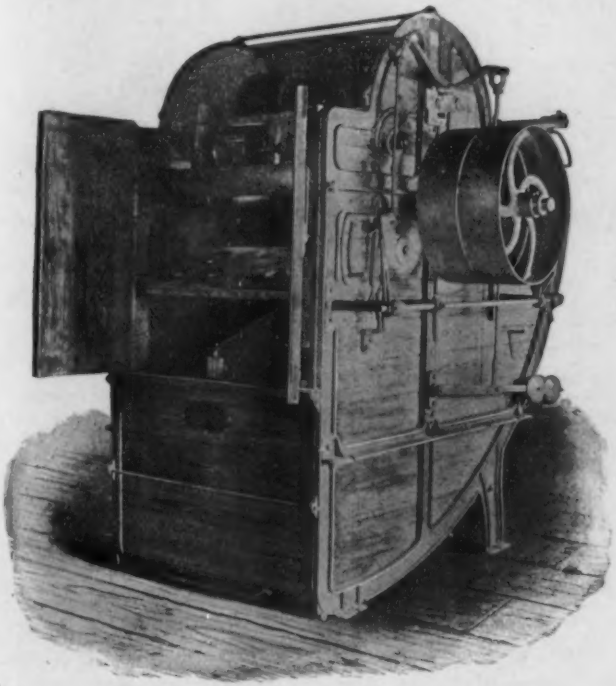

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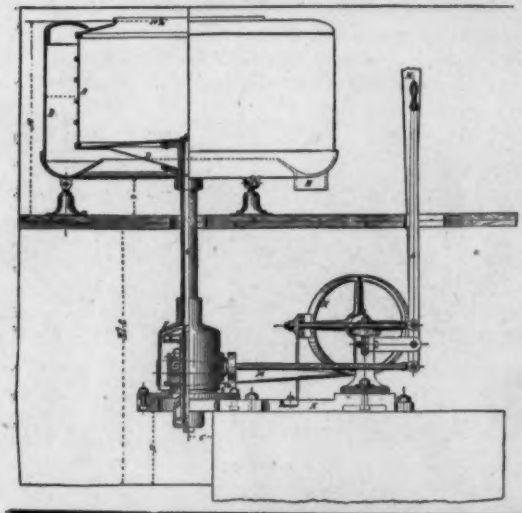

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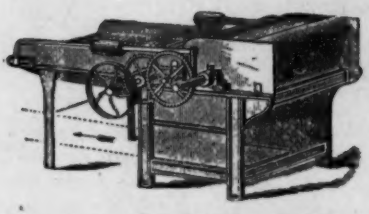

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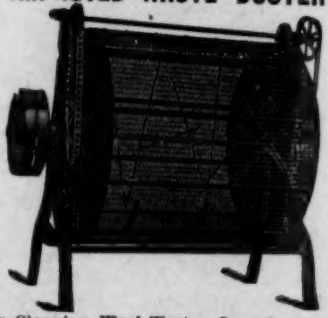

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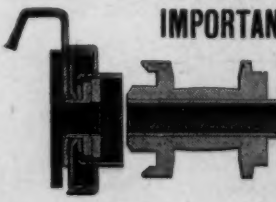

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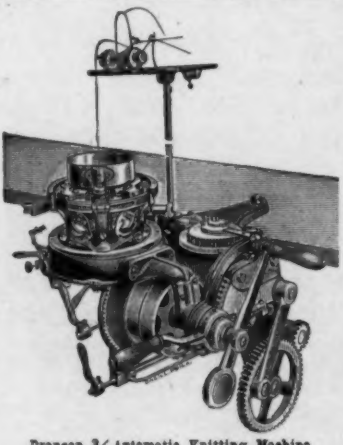

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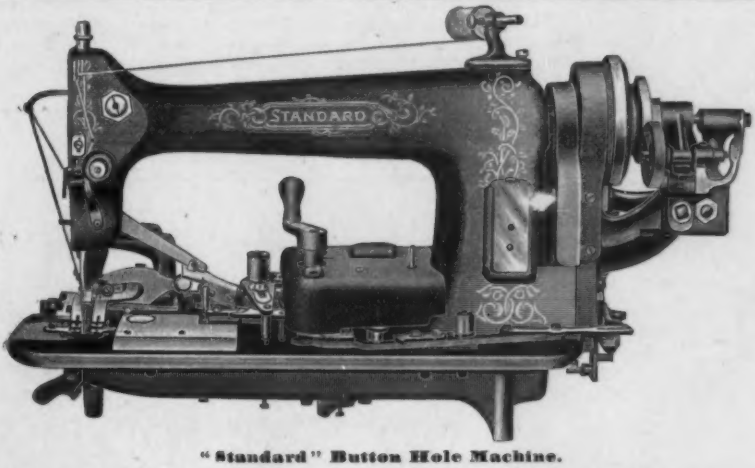

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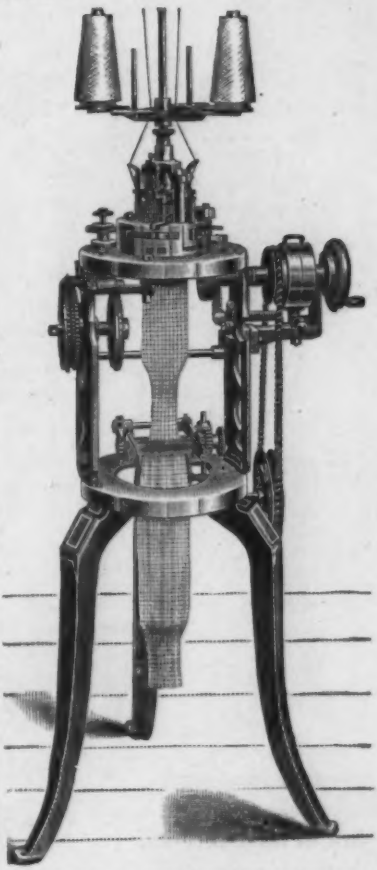

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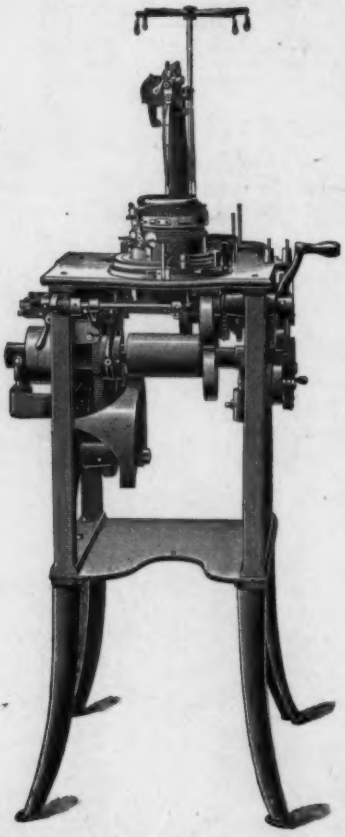

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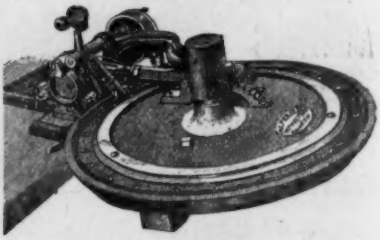

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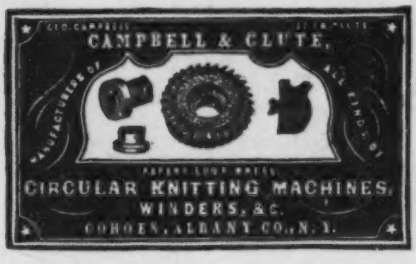

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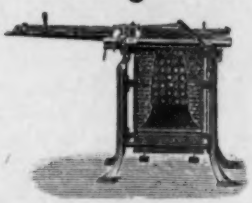

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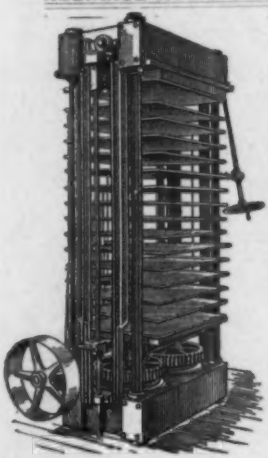

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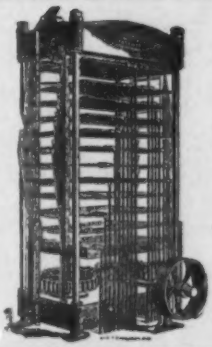

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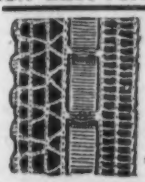

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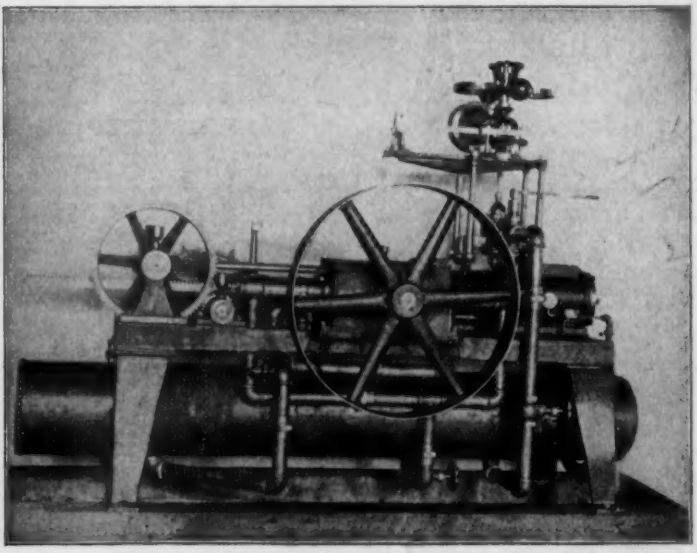

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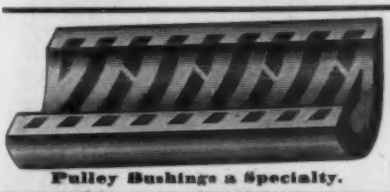

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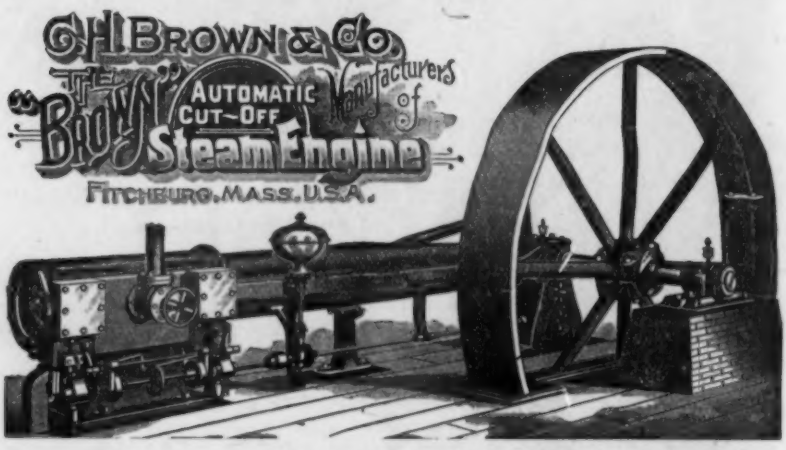

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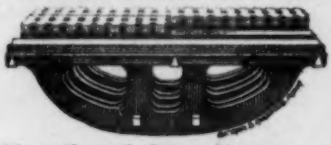

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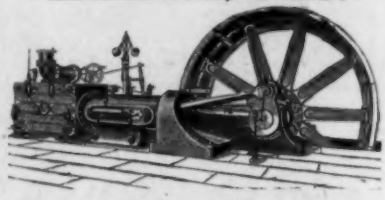

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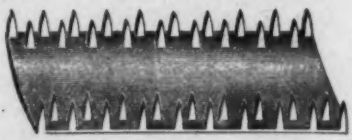

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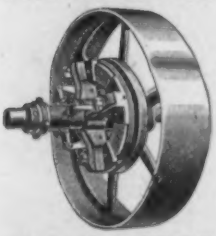

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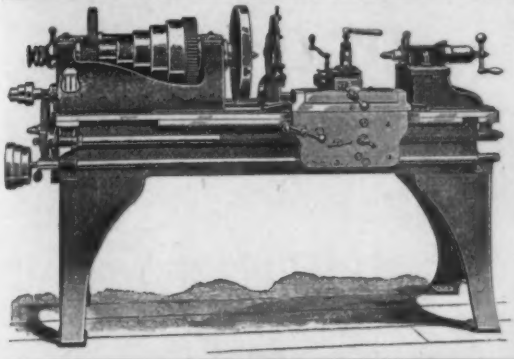

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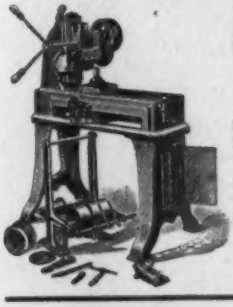

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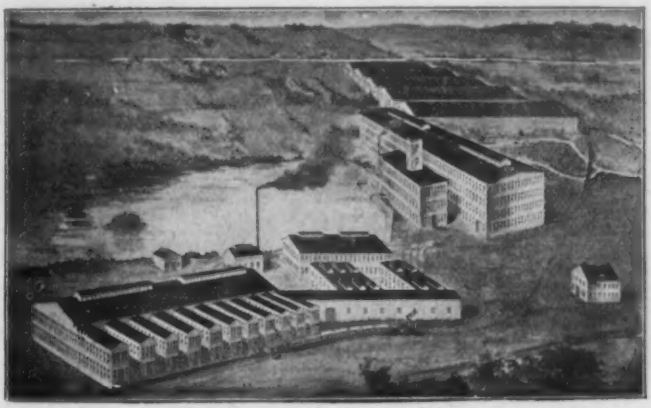

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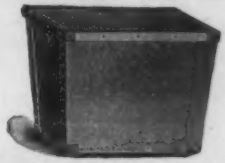

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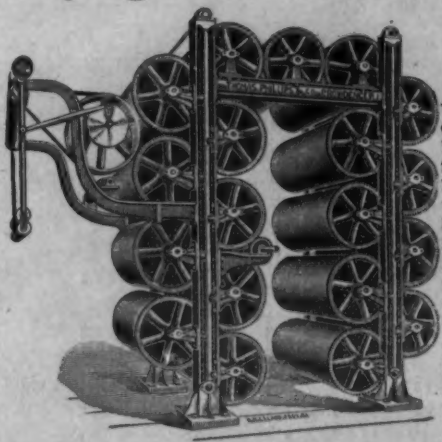

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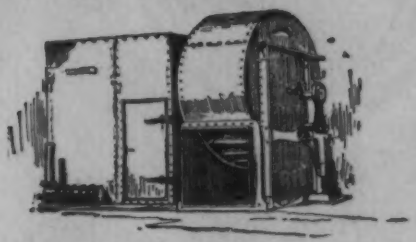

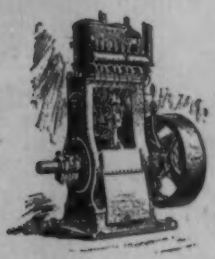

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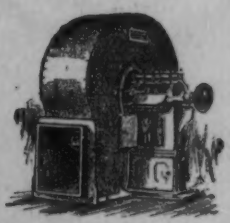

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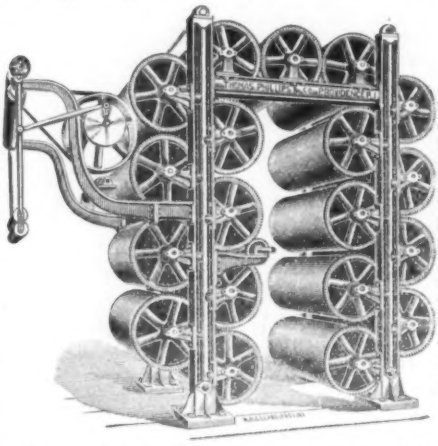

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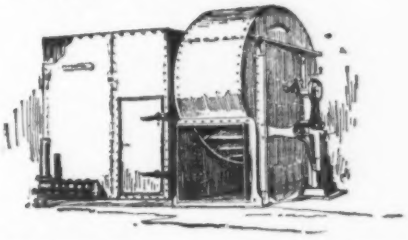

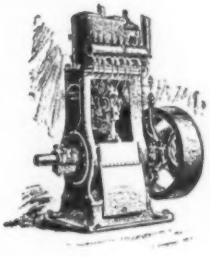

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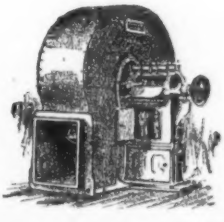

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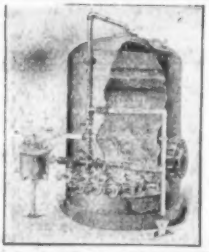

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